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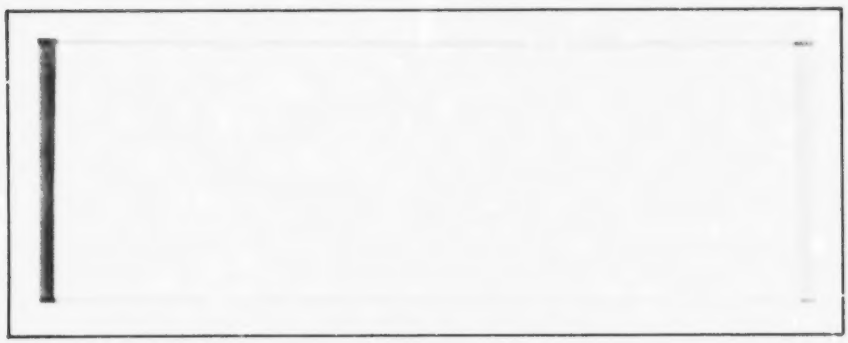

WORKING PAPER

Marketing and Economics Branch

Direction générale de la commercialisation
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Working papers are (1) interim reports completed by the staff of the Marketing & Economics Branch, and (2) research reports completed under contract. The former reports have received limited review, and are circulated for discussion and comment. Views expressed in these papers are those of the author(s) and do not necessarily represent those of Agriculture Canada.

FOOD AND AGRICULTURE REGIONAL MODEL - GRAIN AND OILSEED COMPONENT

(Working Paper 11/85)

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FOOD AND AGRICULTURAL REGIONAL MODEL
GRAIN AND OILSEED COMPONENT

1.0 INTRODUCTION

This report provides a description of the revised grain and oilseed component of the Food and Agriculture Regional Model (FARM). Several submodels can be identified in FARM each of which is designed to forecast the important production, consumption, inventory, trade and price relationships of a particular commodity within the Canadian agricultural sector. The grain and oilseed component contains 9 such submodels. Wheat, durum, barley, oats, rye, corn, rapeseed, flaxseed and soybeans are the commodities covered.

This revised version of the grain and oilseed component differs in three major ways from earlier versions. First, unlike earlier versions, the new component is not forced into the same temporal framework as the rest of the model, but is specified on a crop year basis. Quarterly variables which are required for Outlook purposes or which feed into other blocks of the model are derived from the crop year estimates through linkage equations. These linkage equations essentially overlay a seasonal pattern upon the crop year estimates. The seasonal pattern is modified where needed from the norm to be consistent with other available quarterly endogenous and exogenous information in the model. Second, the revised version is specified on an east-west as well as an aggregate basis to capture the differing and sometimes conflicting economic forces at work behind grain and oilseed production and use in different regions in Canada. In recognition of its importance, Western Canada is described in the greatest detail. Finally, in order to confine the component to a manageable size and still focus on the Canadian sector in depth, the revised version treats the international grain and oilseed market exogenously. However, the component is structured so that groups of U.S. or international crop submodels with similar mixed time frames to the Canadian crop submodels can be easily integrated with it in the future for either policy analysis or forecasting purposes.

2.0 CHARACTERISTICS OF THE SECTOR

2.1 Cash Receipts

In 1983 crop production generated nearly one half or $9.1 billion of the total $18.7 billion of farm cash receipts earned in Canada. The major individual crop contributions were as follows: wheat $4.24 billion, barley $0.92 billion, rapeseed $0.73 billion, corn $0.60 billion, and soybeans $0.25 billion. These numbers alone, however, do not convey the extreme importance of the above commodities as significant foreign exchange earners and/or as major inputs into the livestock production process.

2.2 Production

Wheat has long dominated the Canadian crop sector and can be described as Canada's single most important agricultural commodity. In 1983 total area planted to wheat in Canada reached a record level of 13.7 million hectares or 56% of the total area planted to the major grains and oilseeds. Total wheat production came to 26.6 million tonnes, 96% of which was located on the Prairies, 3% in Ontario and the remaining 1% spread throughout the other provinces. Although some hard red winter wheat is grown in Alberta, spring wheat is still predominant in Western Canada. Approximately 80-90% of this is hard red, and the bulk of the remainder amber durum. Soft white winter wheats are the major varieties grown in Ontario.

The three principal coarse grains grown in Canada are barley, corn and oats. While oats have diminished in importance in recent years, barley and corn have risen. In 1983 7.8 million hectares or 32% of the total area devoted to the major grains and oilseeds in Canada was planted to coarse grains.[1] Total coarse grain production came to

[1] For oats and barley these figures reflect the area which was harvested for grain and not that which was cut for hay and green feed.

21 million tonnes, 61% of which was located in Western Canada, 34% in Central Canada, and the remaining 5% in the Atlantic provinces. The individual coarse grain crops are not evenly distributed in the different regions. In Western Canada barley is the predominant coarse grain and accounts for approximately 75% of the total coarse grain production while in Central Canada corn is the predominant coarse grain and accounts for 80% of the total production. In the Atlantic provinces barley and oats production each account for approximately half of the total production.

Oilseed production in Canada tends to be even more regionally concentrated by commodity than is coarse grain production with rapeseed and flaxseed centered in Western Canada and soybeans in Southern Ontario. Virtually all rapeseed now grown in Canada is canola, that is low erucic acid low glucosinolate rapeseed varieties. In 1983 the 3.1 million hectares which were planted to oilseeds in Canada produced a harvest of 3.8 million tonnes.

2.3 Marketings

2.3.1 Board Grains

Prior to 1973 all interprovincial and export trade of Western wheat, oats and barley was under the jurisdiction of the CWB. Prairie producers were faced with only 3 marketing options. The first option was to deliver their grain to the CWB and receive a pooled price which was paid in two or more installments. The first installment or government guaranteed initial price was made on delivery of the grain. The last installment or final payment was usually made in the first quarter of the succeeding crop year. Intermediary installments or adjustment payments were made throughout the crop year if an increase in initial price was warranted by the export price. Since producers

had no incentive under this system to spread their deliveries throughout the crop year, the CWB set up delivery quotas and rail car allocations to prevent conjestion of the grain distribution system. The second option was to sell their grain intra-provincially either farm to farm, farm to feedlot or farm to feedmill and receive full settlement at the time of the sale. When the CWB delivery quotas proved restrictive, producers were often forced to dump their grain on this local market because of cash flow shortages and large surplus stock buildups. This dumping tended to depress the price which they received. The third and final option was to market their grain through livestock fed on farm.

Since prices in Eastern Canada and British Columbia which were set by the CWB in competition with imported U.S. corn were well above local Prairie feedgrain prices plus transportation costs, pressure was placed upon the Federal government to correct the regional price disparity. As a result in 1974 the new Domestic Feed Grain policy lifted all interprovincial restrictions giving producers a fourth marketing option. Producers could now deliver their grain to private grain companies for shipment off the Prairies to feed deficit regions. The producers would receive full settlement for the grain at the time of the sale the same as they would by selling in the local market. They would be paid the street price which is the futures price established at the Winnipeg Commodity Exchange for the month of potential delivery to the final buyer less handling, freight and storage costs. The CWB domestic price has acted as a ceiling for this street price because the CWB has been obliged to sell grain in the domestic market in 1974 and 1975 at prices based on those at the Winnipeg Commodity Exchange and since 1976 at prices competitive to U.S. corn. This obligation on the CWB, however, was temporarily suspended December 4, 1984 and is currently under review.

2.3.2 Non-Board Grain

Even though canola and flaxseed operate in an open market system, they compete for the same storage and transportation facilities as the board grains. Consequently, in order to prevent congestion they are subject to rail car allocations and the CWB delivery quota system. As long as a producer keeps within these delivery opportunity confines, he is free to deliver his grain either to a country elevator or directly to an oilseed crusher. In the first instance, he will receive the street price and in the second instance, he will receive at least the equivalent of the street price. Since the oilseed crusher does not have to pay freight for direct producer deliveries, he can offer premiums and/or trucking allowances to the producer.

2.4 Exports

Canada ranks second only to the U.S. as a wheat exporter and commands approximately 19% of world trade. In 1983 Canadian wheat exports were a record 21.8 million tonnes which accounted for 59% of total available wheat supplies.

Although Canada is responsible for only 3.5% of world coarse grain production, it ranks fourth behind the U.S., Argentina and the EEC-10 as a coarse grain exporter and supplies approximately 7.5% of world trade being the world's largest barley exporter. Export disappearance varies by commodity. In 1983 Canadian barley exports accounted for 36% of total available barley supplies in contrast to oats exports which accounted for only 3% of total available oats supplies. Traditionally Canada has been a net corn importer, but has achieved net exporter status twice in the last three years.

Canada's status as an oilseed exporter varies by commodity. She is a net importer of soybeans but the largest international exporter of canola and flaxseed. In 1983, canola exports accounted for 48% of total available supplies and flaxseed exports accounted for 69%.

2.5 Domestic Use

2.5.1 Food and Industrial Use

Domestic food and industrial use of wheat comprised 5.5% of total available wheat supplies in 1983. Since 1967 the price of wheat for human consumption has been administratively set by a series of two-price schemes. The policy goal has been to protect domestic milling prices from export and other domestic wheat prices. In 1969 the domestic mill rate was fixed at $72.00/tonne on basis No. 1 Northern, Thunder Bay. The Two-Price Wheat Policy of 1973 subsequently raised this price to $119.40/tonne on wheat other than Durum. Since December 1978 policy amendments have allowed the mill price to fluctuate at export prices within bounds set by the federal government. Prior to December 1, 1984, the export price chosen was the CWB asking price for No. 1 Canada Western Red Spring (CWRS) 13.5% protein at Thunder Bay. Since then a weighted average of the asking prices at Thunder Bay, Vancouver and Prince Rupert has been used. The current program sets the floor of the mill price at $183.72/tonne and the ceiling at $257.21/tonne. When the export price for wheat is within this range, domestic millers are required to purchase wheat at the export price. These purchase prices are fixed for two month periods to provide price stability for Canadian mills. They are fixed at the level the export price was on the 15th day of the preceding month.

In 1983 domestic crush of canola accounted for 37% of total available supplies. The bulk of all soybeans produced in Canada is crushed for oil and meal.

2.5.2. Feed Use

Feed, waste and dockage account for the bulk of total Canadian coarse grain utilization. In 1983 it accounted for 46% of total available barley supplies and 66% of total available corn supplies. The quantities consumed in each region corresponds to the livestock production in that region. Western Canada, Ontario and Western Quebec are self-sufficient in feed grain production. All other regions in Canada are feed deficit. The feed deficit areas have 3 alternative sources of supply: Western Canadian feed grains, Ontario corn and barley, and U.S. corn. The former two are eligible for freight assistance subsidies whereas the latter is not.

3.0 MODEL SCOPE

The grain and oilseed component deals specifically with nine commodities; wheat, durum, oats, barley, rye, corn, canola, flaxseed and soybeans. It places emphasis upon each commodity according to its relative importance in the Canadian economy. The component contains 112 equations, 82 of which are used in the crop year commodity submodels. Table 1 which lists endogenous variables in the component demonstrates the scope of each of the commodity submodels. There are behavioural equations for the supply of each commodity on an east-west basis, for the domestic disposition of wheat, barley, corn and canola on a Canada basis, and for the farm disposition of all wheat, durum, barley, oats, canola and flaxseed on a Western Canadian basis. In addition, there are behavioural equations for the CWB prices of wheat, durum and barley, for farm and port prices of the six major grains in Western Canada, for the elevator prices of corn and soybeans and for the wholesale price of soybean meal. The remaining 30 equations in the component are linkages used to produce quarterly forecasts consistent with the annual of those variables that are required for Outlook purposes and by the rest of the model. These

TABLE 1. ENDOGENOUS VARIABLES IN THE GRAIN AND OILSEED BLOCK

	Commodity Submodels										
	Wheat	Durum	Barley	Oats	Rye	Corn	Canola	Flax-seed	Soy-beans	Soy-meal	Summer-fallow
Supply Side											
Western Canada											
Acreage	x	x	x	x	x		x	x			
Production	x	x	x	x	x		x	x			x
Eastern Canada											
Acreage	x		x	x		x			x		
Production	x		x	x		x			x		
Imports						x					
Demand Side											
Western Canada											
Farm Marketings	x	x	x	x			x	x			
On-Farm Feed Use	x		x	x							
Farm Inventories	x	x	x	x			x	x			
Canada											
Food & Industrial Use	x					x	x				
Feed Use	x		x			x					
Exports						x					
Commercial Stocks	x		x				x				
Total Stocks	x		x			x	x				
Prices											
C.W.B. Initial	x	x	x								
C.W.B. Adjustment	x	x	x								
C.W.B. Final	x	x	x								
C.W.B. Domestic	x										
C.W.B. Asking	x										
Export Unit Value	x		x								
Domestic Port Price			x	x			x	x			
Prairie Price	x		x	x	x		x	x			
Elevator Price						x			x		
Wholesale Price										x	

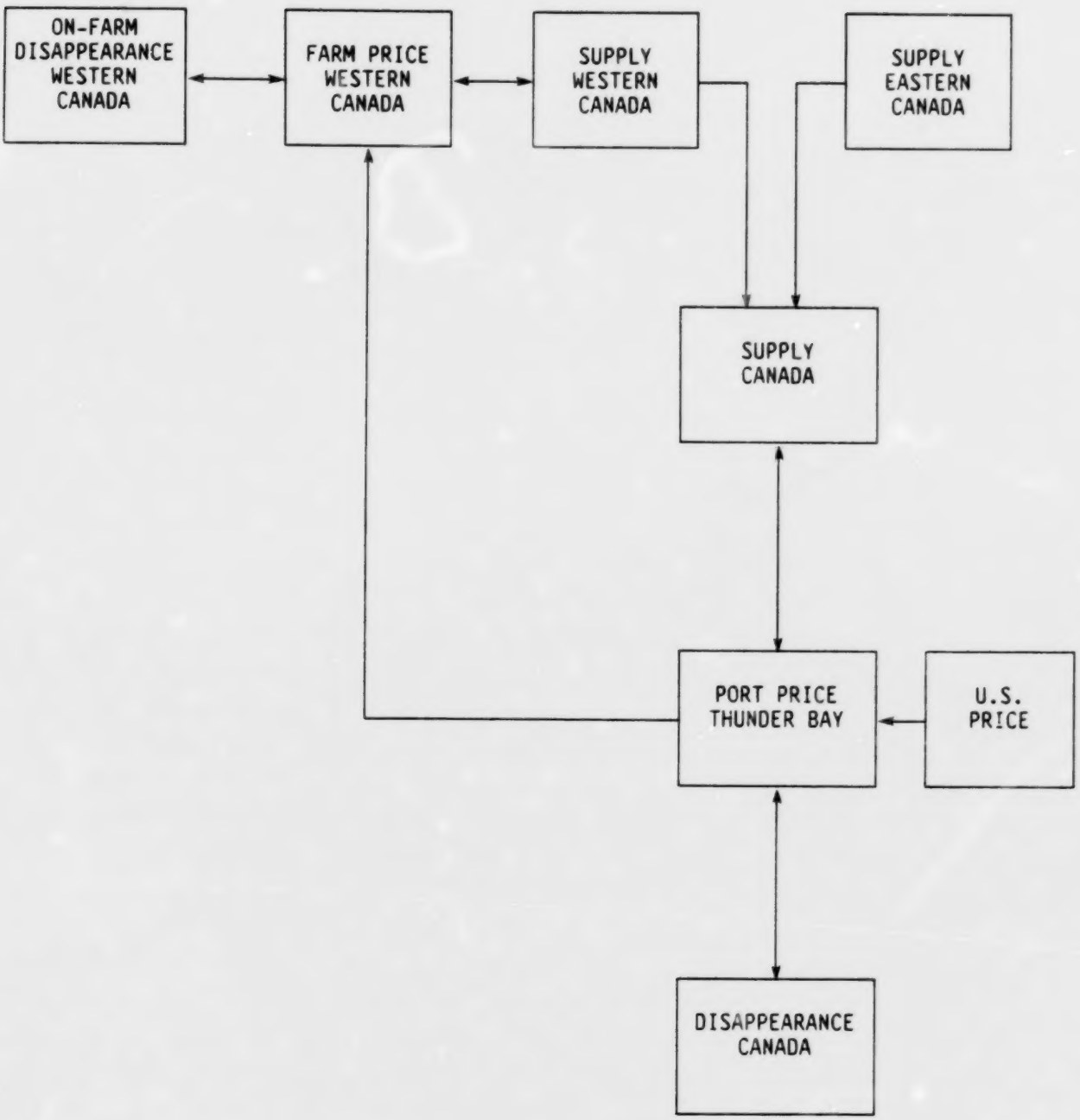
variables include prices, marketings and inventories. There are no corresponding annual estimates for 3 of these variables in the crop year submodels. The key exogenous variables in the grain and oilseed component include exports and U.S. commodity prices. Canadian livestock numbers and prices are also exogenous to this component but are endogenous to other components within FARM.

4. CONCEPTUAL FRAMEWORK

Because of data limitations and model size considerations, the international market is treated as exogenous to the grain and oilseed component and concentration is placed upon the domestic market. Consequently, given that Canadian crop prices are determined largely in the international market, none of the commodity crop year submodels can be specified as price equilibrium models. Nevertheless, there are still structural equations for most of the major entries of the balance sheet. Price linkage equations are used in the absence of the trade sector to determine Canadian prices from U.S. prices. The latter were chosen as proxies for the international prices because of the dominance of U.S. wheat, corn and soybeans in the respective world wheat, coarse grain and oilseed markets.

Figure 1 illustrates the structure of a typical crop submodel in the grain and oilseed component. Whether this entire structure or only portions of it are used for each commodity in the component depends upon the commodity's importance. The structure balances at two levels: at the Western Canadian farm level by using closing farm inventories as the residual and at the Canadian aggregate level by using closing commercial inventories. Total inventories are then calculated as the sum of the commercial inventories, the Western Canadian farm inventories and exogenous Eastern Canadian farm inventories. It should be noted that a complete commercial level balance sheet can not be worked out within the confines of this model structure (although major portions can be identified) since feed and seed use are not distinguished between at the farm and commercial level on a country-wide basis.

FIGURE 1. STRUCTURE OF A TYPICAL CROP SUBMODEL



The next 2 figures provide graphical representations of within crop year quantity adjustments in the typical crop submodel at the Western Canadian farm and Canadian aggregate levels respectively, given U.S. prices. The key Canadian prices required for these figures are the expected CWB Final Price (FP), the Corn Formula Price (CF), the CWB Initial Price (IP) and the Off-Board Price (OP). The first two are assumed to be merely derivatives of U.S. prices, while the latter two, although heavily influenced by U.S. prices, reflect also the Canadian supply and demand situation. Since initial prices are announced prior to planting they reflect the expected supply-demand situation at that time while the off-board price reflects both the current and the expected supply-demand situation in the succeeding crop year.

Panels A, B, and C in Figure 2 illustrate the various marketing options open to the Western Canadian producer. The curve BMBM in Panel A shows the amount of grain the producer will supply to the CWB if his CWB entitlement is not restrictive. The curve is perfectly inelastic below the initial price since the producer is guaranteed this minimal return, and is an upward sloping function of the expected final price above it. If, however, the CWB quota is restrictive, confining the producer's deliveries to a maximum amount of say X12, then his supply curve would be BMMBM' that is vertical at X12 above the point M rather than upward sloping.

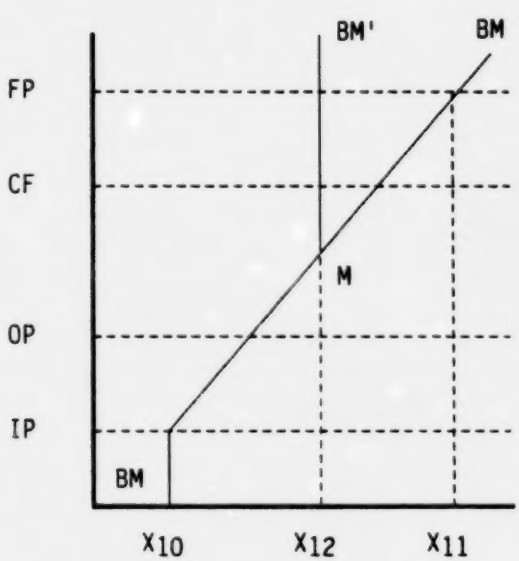
The curve OMOM in Panal B shows the amount of grain the producer will supply to the off-board market, that is to the private grain companies and to the local markets, if the off-board quota is not restrictive. It is slightly to the left of the supply curve BMBM on the assumption the producer prefers to deliver to the CWB. The curve OMOM is an upward sloping function of the off-board price that is kinked at both the initial and corn formula prices with the segment of the supply curve below the initial price being more elastic and the segment above the corn formula price being more inelastic than the segment between the initial and corn formula prices. The greater elasticity of the supply curve below the initial price reflects the reluctancy of the producer to deliver to the off-board market if the off-board price dips below the initial price because he could earn a greater return by

delivering to the CWB market. The producer will only deliver at these low off-board prices if CWB quotas are restrictive and he is in a short cash flow situation. The greater inelasticity of the segment of the supply curve above the corn formula price reflects that while the corn formula was still in effect, it acted as a ceiling or at least a buffer for the off-board price rather than a change in the willingness of the producer to deliver. Consequently, this year with the suspension of the corn formula price, OMOM" would be the relevant supply curve. If, however, the off-board quota is restrictive, confining the producer's deliveries to a maximum amount of say X22, then the supply curve would be OMNOM' whether the corn formula is in effect or not. Note that although the curve is steeply upward sloping above N it is not completely vertical since the off-board quotas apply only to deliveries to the private grain companies and not to those to the local market.

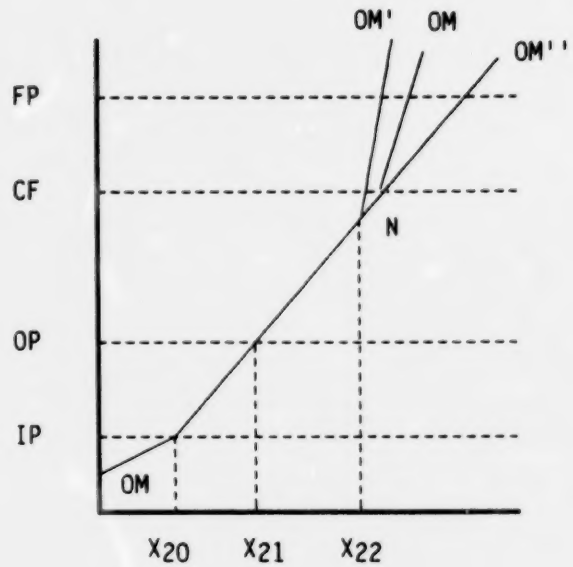
The curve DD in Panal C is the demand curve for on farm feed use. It is a downward sloping function of the off-board price. As the off-board price drops ceteris paribus, the producer will realize greater returns by marketing his grain through livestock rather than selling it directly.

Finally, in panal D the curve SS is the crop year supply curve and the curve FIFI is the horizontal summation of the curves in panals A, B and C assuming quotas are not restrictive. (Likewise the curve FIFI" is also the horizontal summation of the curves in the other panals with open quotas - but in the absence of the corn formula price.) The difference between the two curves SS and FIFI is farm inventories. As can be seen farm inventories are negatively related to the general price level. Consequently, given no restrictions in quotas, a crop year supply of X40, an expected final price of FP and an off-board price of OP, then the amounts of grain the producer would deliver to the CWB, deliver to the off-board market, use on farm for feed and store as stock would be X11, X21, X31 and A or X40-X41 respectively.

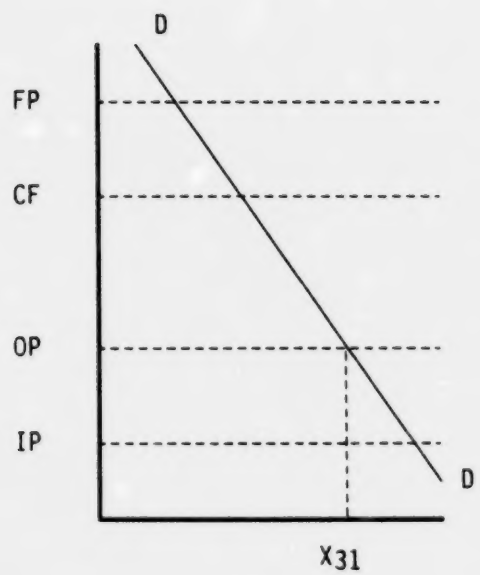
FIGURE 2. WITHIN CROP YEAR QUANTITY ADJUSTMENTS AT THE WESTERN CANADIAN FARM LEVEL FOR THE TYPICAL CROP SUBMODEL



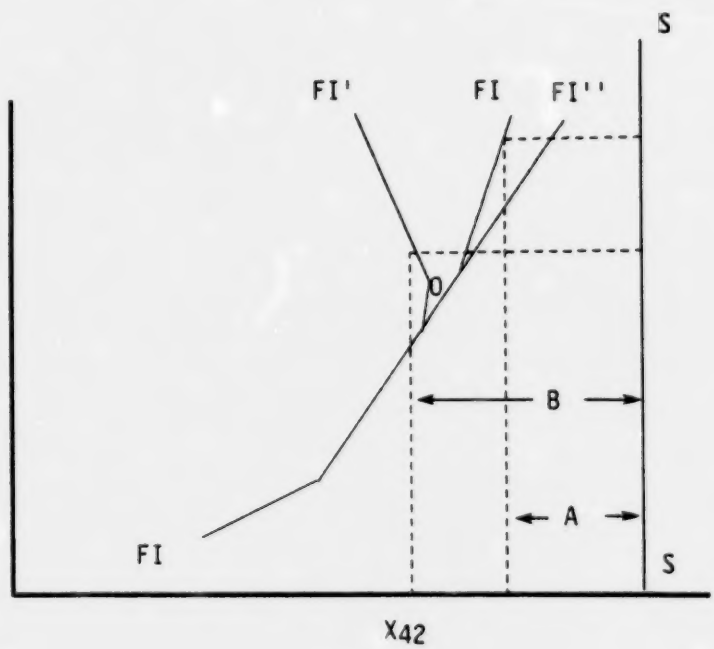
PANAL A
C.W.B. MARKETINGS



PANAL B
OFF-BOARD MARKETINGS

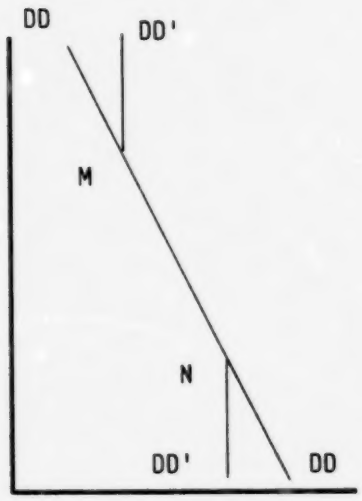


PANAL C
ON-FARM USE

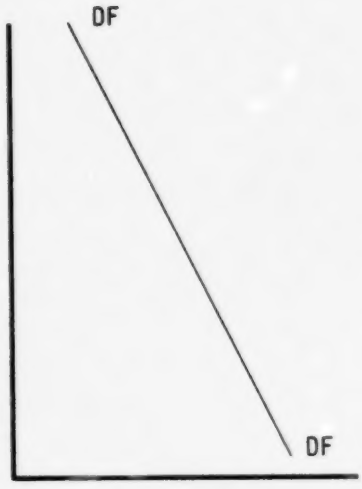


PANAL D
FARM INVENTORIES

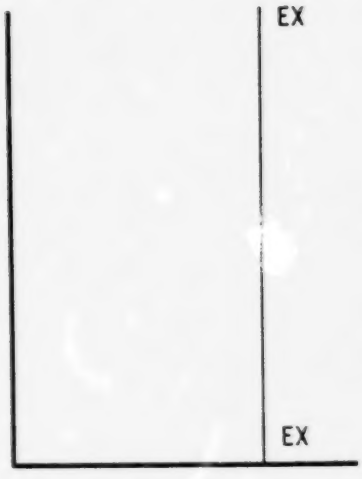
FIGURE 3. WITHIN CROP YEAR QUANTITY ADJUSTMENTS AT THE CANADIAN AGGREGATE LEVEL FOR THE TYPICAL CROP SUBMODEL



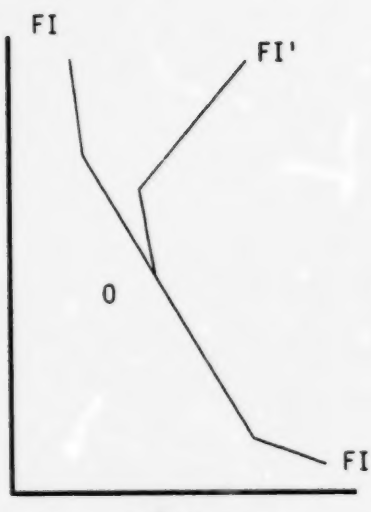
PANAL A
FOOD & INDUSTRIAL USE



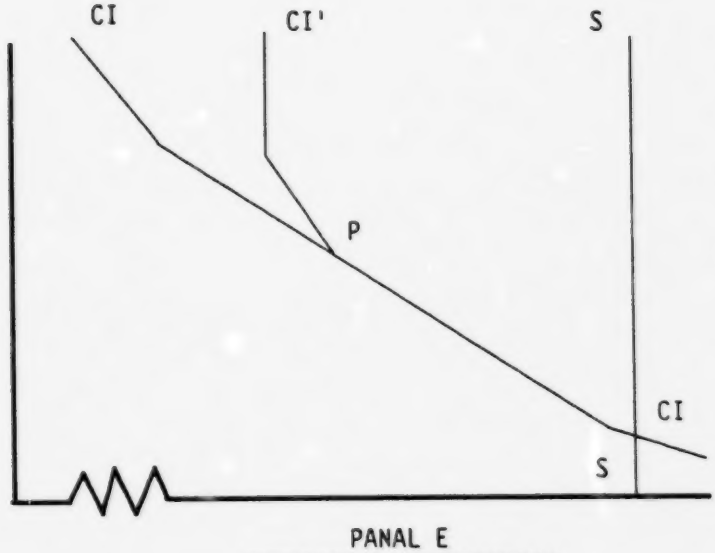
PANAL B
FEED USE



PANAL C
EXPORTS



PANAL D
FARM INVENTORIES



PANAL E
COMMERCIAL INVENTORIES

The backward bending curve FIOFI' is the horizontal summation of the curves in panal A, B and C when quotas are restrictive. As prices rise, and the producer is prohibited by quota to market the amount of grain he would normally desire to do so, he will build-up involuntary stocks rather than feeding the grain in the hope quotas will open in the future and he will be able to sell at that high price. In this case, given an expected final price of FP and an off-board price of OP, the CWB quota would be restrictive while the off-board quota would not be. Consequently, the producer would deliver X12 to the CWB, deliver X21 to the off-board market, feed X31, and store B or X40-X42 amount of grain.

Figure 3 is similar in design to Figure 2 and shows the relationship between commercial inventories and price in the typical crop submodel. Panals A and B show the demand curves for food and industrial use and for feed use. These curves are conventional in nature being downward sloping functions of price. (Note: in the case of wheat where floors and ceilings are set by the CWB for the domestic mill rate the relevant demand curve (Spriggs, 1981) for food and industrial use would be DD'MNDD'). Panal C shows exports which are exogenous to the model, and thus price insensitive. Panal D is simply the summation of Western farm inventories that were derived in Figure 2 and Eastern farm inventories which are assumed to be price insensitive. In Panal E curve SS is the total supply and curve CICI is the horizontal summation of the curves in the four previous panals when quotas are not restrictive and curve CIPCI' is the horizontal summation when they are restrictive. Consequently in each of these cases commercial inventories can be calculated as the difference between total supply and the amount of grain destined for all other uses. If quotas are not restrictive, then commercial inventories are an upward sloping function of price, while if they are restrictive, commercial inventories become a backward bending supply curve.

5. STRUCTURE OF THE COMPONENT

5.1 Relationship to Other Blocks in Farm

Because of increased data reliability, and closer confirmation to the crop production cycle as well as economic agents decision horizons, the structural integrity of the grain and oilseed component has been improved by specifying it on a crop year time frame. However, the relationship between the grain and oilseed component and other components has been restricted to be primarily recursive. This implicit causality assumption between the feed grain and livestock submodels is tenable though not ideal. Livestock production and prices tend to be more sensitive to grain and high protein meal prices than vice versa. Crop producers can only marginally alter their output after planting and not at all after harvest. Livestock producers, on the other hand, can alter theirs in the short run by disinvesting in their breeding herd and changing their livestock's market weight and/or rate of gain.

The crop year submodels are designed to solve for the average annual grain and oilseed prices in the third calendar quarter to correspond with harvest and thus the start of a new crop year. These annual prices are then passed to the linkage equations where they are seasonally adjusted and appropriately distributed throughout the crop year. Finally, in their quarterly transformed states, the annual prices are then passed to the livestock submodels. There is not, however, a strict one-way causality between these three steps; for example, quarterly crop prices and hog inventories feed back into the acreage equations, and livestock inventories feed back into the quarterly off-board barley price and the crop year feed demand equations.

A weak simultaneous link does exist between the feed grain, and hog submodels. Hog prices in the third calendar quarter are used to determine annual barley and corn feed use.

5.2 Supply Response

The supply of canola and corn on a Canada basis and the other crops on a Western and Eastern basis is calculated as the product of area times yield.

5.2.1 Acreages

Producers engage in a two-part decision making process to determine crop area. In the first stage producers decide on the total area they are willing to commit to crop production. In the second stage producers decide how to allocate the total area among competing crops. At the present moment total area is exogenously determined in the grain and oilseed component. Although this total area may vary significantly in the long run as land is transferred in and out of livestock production and non-agricultural uses, in the short run it tends to be stable as producers are faced with a relatively fixed land base. Consequently, keeping this total area exogenous does not present a major problem as long as the component is used for short-term forecasting purposes, but may cause problems in medium to long-term forecasts and policy analyses. Two multinomial logit models, one for Western Canada the other for Eastern, are used to estimate producers' allocation decisions. They are ideal for this purpose since they constrain the estimated share of the individual crops to sum to the total area. Further, they provide a complete set of own and cross elasticities since the estimated share of each crop is dependent upon all the explanatory variables in the system. These advantages, of course, have to be weighed against their computational disadvantages; i.e. their non-linearity, the need for simultaneous estimation methods, and the use of a different structural form for estimation versus simulation.

The structural form of the multinominal logit models used for estimation has the log of the ratio of individual crop acreages to a base crop as the regressand and the individual minus the base crops specifications as the regressors. Consequently, it is impossible to uniquely identify the parameters for any exogenous variable that appears in both the individual and base crop specifications, although the difference between them can be determined.

In the Western Canadian acreage model, bread wheat is selected as the base crop and a traditional format chosen for the individual crop specifications. Planted area is assumed to be a function of the supply inducing price, cost of production, quota restrictions, farm inventories, government policy variables and trend. CWB initial prices less transportation and handling costs are used as the supply inducing prices for wheat and barley, while the farm prices received in the quarter prior to planting are used for the other commodities. Cost of production is calculated as total crop expenses per planted acre divided by the individual crops three-year moving average yield. The fourth and first quarter marketings prior to planting are used as proxies for quota restrictiveness. Hog inventories are included in the barley specification since many Prairie hog producers plant barley for their own expected feed needs. Further details regarding the Western Canadian acreage model are contained in a forthcoming working paper (Paddock and Krakar, 1985).

In the Eastern Canadian acreage model wheat is selected as the base crop since it shows the least trend over the estimation period. The individual crop specifications are much simpler than those employed in the Western model and include only the supply inducing price, trend, and a dummy variable for winter kill.

5.2.2 Yields

Crop yields in Canada as in other countries have been trending upwards over time because of improved varieties, increased fertilizer, pesticide and herbicide applications and better cultural and management practices. However, fluctuations around these trends in Canada, because of environmental conditions, tend to be among the highest in the world and exceed those of other major cereal producing regions such as the United States. As a result crop yields cannot be estimated as a simple function of trend without first accounting for this variability since the estimated slope parameter on the trend variable would be highly sensitive to the choice of the regression period. In the grain and oilseed component various climatic measurements such as temperature and precipitation, and environmental indicies such as Narayanan and Dyer's (1983) GRODEX, which combines weather variations, soil moisture conditions and crop growth factors, were tried in the yield equations. However, since at the present time these variables cannot be projected reliably over any long range horizon, and only had limited success in explaining the fluctuations, yields are treated as exogenous to the component.

5.3 Marketings

5.3.1 Crop Year Marketings

The marketing equation specifications for wheat, oats and barley are designed to include factors that influence both the CWB and off-Board deliveries. Both supply and demand factors are embodied in these equations to explain off-Board deliveries. Only demand factors are used to explain CWB deliveries under the assumption the CWB usually gets all the grain it wants since it is producers' preferred marketing medium.

In general farm marketings are hypothesized to be functions of the demand for grain by the CWB, quota restrictiveness, price, opening supplies, and the demand for Western grain in Eastern Canada.

Commercial inventories and food and industrial use plus export use are used to measure both the demand for grain by the CWB and quota restrictiveness. The difference between usage and opening stocks are used in the former case while the ratio between closing stocks and usage are used in the latter. Corn production is employed as a proxy for the demand for Western grain in Eastern Canada under the assumption that this demand will decrease as Eastern Canada's self-sufficiency in coarse grain production increases. The two constructed variables for CWB demand and quota restrictiveness are designed to primarily explain CWB deliveries while price, opening supplies and corn production are designed to primarily explain off-Board deliveries.

The specifications for the marketings of canola and flaxseed are similar in design to that for deliveries of the Board grains to the off-Board market in that they include both supply and demand factors. Oilseed marketings are hypothesized to be a function of food and industrial use plus exports, the ratio of the port price to the farm price, and opening supplies.

5.3.2 Quarterly Marketings

Each of the quarterly marketing equations are essentially an aggregation of five separate equations that deal with August and September marketings, the fourth, first and second quarter marketings and July marketings, respectively. The quarterly equations are segregated in this manner for two reasons. First, since the grain and oilseed component is crop year based most of the variables within it avaialable to explain quarterly marketings have an annual periodicity associated with them. It is assumed that the influence of any one of

these will vary during the crop year, and consequently that different crop year explanatory variables are needed to explain the different quarterly marketings. Second, although exact conformity cannot be enforced between the crop year marketing estimate and the calendar quarter marketing estimates in the absence of unique variables for July marketings and August and September marketings in the component, it can be encouraged and later checked for by specifying the quarterly equation so as to clearly distinguish between the two. Consequently, in the third quarter, the behavioural equation is designed to solve for August and September marketings alone by calculating July marketings with a pre-estimated equation and then treating this pre-estimated equation as part of the intercept. For wheat, oats and barley, July marketings are specified to be a fixed proportion of the difference between closing June and July farm inventories. In the years in which grain elevators extend July 31 on their books to allow producers to complete all their deliveries which they wish to make within the crop year, note this fixed proportion calculation may substantially underestimate July marketings. Since quarterly inventories are not available in the component for the other crops, the pre-estimated equations specify July marketings to be functions of closing crop year farm stocks, price, and the difference between the previous crop year total marketings and the fourth, first and second quarter marketings.

August and September marketings are hypothesized to be negatively related to July marketings and opening commercial inventories, and to be positively related to exports, price and opening supplies. If July marketings are large this usually indicates that either initial prices are to decrease in the new crop year or that quotas are expected to be restrictive. Since July marketings are absent from the component, the pre-estimated equations discussed in the previous paragraph are used in their place in the individual specifications.

Fourth quarter marketings are hypothesized to be a linear function of opening crop year commercial inventories, total crop year marketings, price and any CWB adjustment payments.

First quarter marketings are hypothesized to be a function of the total crop year marketings that have yet to be delivered, price, and any CWB adjustment payments.

Second quarter marketings are hypothesized to be a function of the same factors that are used to explain first quarter marketings.

5.4 Food Use

Food and industrial use for grains and oilseeds at the wholesale level is a derived demand generated from retail demand for bakery, cereal and oilseed products. Consequently the demand functions for the individual crops should theoretically include both the price of the final product and the price to the miller or crusher. Food and industrial use of canola accordingly is specified to be a function of population and the ratio of the final product price to the farm price. The final product price is calculated by weighting in Canadian dollars the Decatur soybean oil price and the discounted Decatur soybean meal price by the average percent yield of their canola counterparts per tonne of seed. Soybean meal prices are discounted to reflect both canola meal's lower protein content and its lower acceptability as a feed ration. However, since the acceptability of canola meal has improved somewhat with the introduction of low glucosinolate varieties, in the third quarter of 1979 the price discount is reduced from 35 to 25 percent of the soybean meal price.

Because the retail prices of the final products for wheat are endogenous to the consumer price index component which has strictly a quarterly time frame, only the retail prices in the third quarter are available to the wheat demand equation during simulation of the whole

Food and Agricultural Regional model. Unfortunately, these CPI's in the third quarter are not always representative of the prevailing retail prices that will occur during the crop year. It is probably this reason why the estimated coefficients for the retail price were statistically insignificant and/or showed theoretically inconsistent signs in the wheat equation. As a result, wheat food and industrial use is specified to be a function of just the domestic mill price and population.

5.5 Feed Use

Theoretically, feed use, a derived demand, is a function of the price of the feed grain, the price of competing feed grains and high protein meals, the price of the slaughter animal or livestock product, and livestock numbers. Superficially the feed use equations in the grain and oilseed component contain all these ingredients. However, since they must be estimated in the same time period as the rest of the equations in the crop year submodels, they lack complete information from the livestock components. Only livestock prices and numbers at the beginning of the crop year are available for use. These third quarter livestock prices often prove to be inadequate proxies for the crop year prices, and although cattle numbers usually do not change substantially within a crop year, hog and poultry numbers can do. Another major problem is the feed demand data themselves. The data are only a rough measure of actual feed usage since Statistics Canada calculates them as residuals from their balance sheets.

Each feed demand equation is specified to be a function of a subset of the following variables: July 31 or September 30 hog inventories, July 31 heifer and steer inventories, the ratio of the third quarter hog price to its year ago value, the third quarter hog-barley price ratio, the own feed grain price, competing feed grain prices, opening supplies, the availability of other feed grains, and a linear trend.

5.6 Farm Inventories

Quarterly farm inventories for wheat, oats and barley are calculated as residuals from pseudo-identity equations. In the third, fourth and first quarters they are calculated by subtracting quarterly marketings and a proportion of annual feed use from each quarter's opening supplies. In the second quarter annual seed use is also subtracted from opening supplies under the assumption crops are planted in that quarter.

5.7 Price Transmissions

5.7.1 U.S. To Canadian Price Linkages

Many of the key Canadian grain and oilseed prices are simply specified as a linear function of the appropriate U.S. price times the exchange rate with adjustments for local Canadian supply and demand conditions. The asking price for #1 CWRS wheat, for example, is a linear function of the #1 HRW U.S. Gulf price in Canadian dollars, opening Canadian supplies and Canadian exports. The Chatham corn price is a linear function of the Chicago corn price in Canadian dollars, Canadian corn production and opening barley supplies. The Vancouver canola price is expressed as a linear function of the Decatur soybean oil and meal prices in Canadian dollars and Canadian canola exports.

5.7.2. Off-Board Prices

The CWB initial price tends to set a floor for the off-Board price while the CWB domestic price, which is a function of the corn price, sets a ceiling. Taking these bounds into account, the off-Board price of barley at Thunder Bay is specified to be a function of the initial price, any adjustment payments that are made by the CWB, farm inventories and the corn price. The equation explaining the Prairie off-Board price of wheat has similar ingredients to the Thunder Bay barley equation but uses the Prairie off-Board price of barley as the relevant competing feed grain price rather than the corn price.

In the absence from the model of the appropriate CWB prices, the off-Board price of oats at Thunder Bay is hypothesized to be directly related to the off-Board barley price taking into consideration the relative availability of oats to that of barley, and feed demand. Farm inventories of oats and barley are used as proxies for the former and inventories of dairy heifers and cows as proxies for the latter.

5.7.3 Port to Prairie Price Linkages

Prairie prices are a delivery weighted combination of elevator prices and local market prices. These prices do not necessarily move in synchronization with each other since price arbitrage can not occur freely between the two markets because commercial elevator deliveries are subject to quotas. Elevator prices are essentially the Thunder Bay prices less transportation and handling costs while local market prices are barometers of local supply and demand conditions.

In the grain and oilseed component, it is assumed that the weight of the elevator prices predominate in these Prairie prices. The off-board and farm prices are hypothesized to be functions of the respective Thunder Bay prices less transportation costs and a linear trend variable to reflect increasing handling costs over time. The relatively minor influence of local prices is taken into account in these specifications by including some local supply measure such as opening farm supplies or production in Western Canada; the farm price of a competing crop; and some demand measure such as hog inventories or opening commercial inventories.

5.7.4 Annual to Quarterly Price Linkages

There are two types of annual to quarterly price linkage equations in the grain and oilseed component; those for the Port prices and those for the Prairie off-Board and farm prices. In the first case the within year price variations of Canadian port prices are assumed to move proportionately with the indicator U.S. prices. Accordingly, the Canadian quarterly prices are regressed against their annual value multiplied by one plus the percent change of the corresponding U.S.

quarterly price from its seasonal average value. A different coefficient is allowed for in each quarter since the influence of the U.S. price on the Canadian price is expected to vary seasonally. For example the correlation between the within year variations of the Chicago and Chatham corn prices is expected to be less in the winter months when navigation on the Great Lakes is closed than in the summer (Meilke & de Gorter, 1978). In addition the quarterly prices are regressed against the exchange rate, and some measure of Canadian supply. Ideally, some measure of U.S. supply should also be included in these equations.

In the second case the within year price variations of the Prairie prices are assumed to move proportionately with the corresponding port prices. Hog and grain inventories are included in these specifications to capture the impact of local supply and demand conditions on seasonal price variations.

5.8 Canadian Wheat Board Prices

5.8.1 C.W.B. Initial Prices

The Government of Canada with the recommendation of the CWB tries to set initial prices in accordance to their export price expectations just prior to spring planting for the succeeding crop year. These initial prices tend to be quite static and are set conservatively to avoid any deficit in the Pool account. The initial prices of wheat and barley in the model are specified to be functions of the lagged initial price to reflect their relative stickiness, and the lagged stocks-to-use ratio and the expected U.S. price in Canadian dollars in the forthcoming crop year as proxies for the government's price expectations. Actual U.S. prices are used as the expected U.S. prices, althougn ideally something like the U.S.D.A.'s spring predictions of the average annual farm prices of wheat and corn should be used instead. Since corn and barley are not perfect substitutes for each other, the lagged export unit value price is also included in the initial price of barley equation. The initial price of durum equation reflects the fact that until 1978, when a separate pool

account was established for durum, the initial price of durum was the same as that for wheat. Since 1978, the intial price of durum has been estimated as a linear function of the asking price for #1 CWAD and the lagged initial price.

5.8.2 Adjustment Payments

If the export price rises well above the initial price during the crop year, the Government of Canada, on the recommendation of the CWB, may raise the initial price to encourage marketings and/or avoid having a very large final payment. The amount by which the initial price is increased is called the adjustment payment. Since 1967 whenever the initial price of wheat has dropped below 70% of the unit value export price, an adjustment has been made in the intial price. A similar rule of thumb has held for barley. Whenever the intial price of barley has dropped below 75% of the simple average of the unit value export price and the Chicago corn price in Canadian dollars, an adjustment has been made. The adjustment payment equations apply these tests and if an adjustment is indicated they calculate it as a linear function of either the difference or the ratio between the export price and the initial price and the most recently received final payment.

5.8.3 C.W.B. Final Prices

The CWB pools all returns received from the sale of a particular grain in a single fund. If the money in the pool at the close of the season is less than the initial payments plus costs incurred by the CWB, the final price is the initial price. Otherwise the final price is the initial price plus the per unit payment calculated from the pooled returns in excess of the initial payments and CWB costs. Assuming the CWB administrative costs are roughly a constant percentage of the price of the grain, the final prices are specified as fractions of the 15 month October-December weighted average export price to correspond with the CWB marketing year. The export prices in the 1st, 2nd, and 3rd calendar quarters are each given a whole weight while the two 4th quarter prices are each given half weights since the CWB sells a

mixture of both the old and new crop during the 4th quarter. Because there is no mechanism in the equation to prevent the final price from dipping below the initial price, the equation can distinguish between a deficit or break even situation in the pool account.

5.8.4 DOMESTIC PRICES

The domestic mill price for wheat is solved for in an identity which essentially employs simplifications of the different administrative formulas (discussed in Section 2.5.1) in effect since 1969.

6.0 EMPIRICAL RESULTS

The start date of the regression range for equations in the grain and oilseed component varied between the third quarter of 1967 and the third quarter of 1969 depending upon data availability. The common end date was the second quarter of 1983. Except for the two multinominal logit models for crop acreages, each equation was estimated by Ordinary Least Squares (OLS). The OLS regression results are presented in Appendices B through J broken down by commodity. Note when examining these results that the goodness of fit criteria, such as the coefficient of determination (R^2) and the t-statistics, for the crop year equations are overstated because a perfect fit for these equations was forced in three out of four quarters.

The two multinominal logit models were estimated as sets of seemingly unrelated regression equations with the coefficients for the base acreage equation providing constraints across equations. The Generalized Least Squares (GLS) regression results are presented in Appendix A. Since these sets of equations were estimated outside of the crop component with an annual periodicity, the reported goodness of fit criteria can be taken at face value.

Own and cross elasticities were evaluated at the regression means. Select results of these calculations are presented in Tables 2 through 9 according to economic classification. Note that the elasticities contained in Tables 2 and 3 may be applied to either the share or absolute level of the acreages (Colman, 1979).

Most of the estimated parameters on the explanatory variables in the acreage equations are statistically significant, and the sign of each coefficient coincides with a priori expectations. In general, the larger a particular crop's share of total acreage, the better the fit of the estimated equation, the lower the calculated own elasticities, and the higher the calculated cross elasticities. Eastern Canadian acreages appear to be less price responsive than are Western Canadian acreages, but have greater serial correlation associated with them. The estimated results of the Western Canadian acreage model are discussed in greater detail in Paddock & Kraker (1985).

For the remaining equations in the model, the fit of the crop year equations is notably higher than the fit associated with the quarterly equations. Even after deflating the R2's, at least 90 percent of the variation in the dependant variable of all the crop year equations, save one, is explained by the estimated equations. The misfit equation attempts to explains the CWB adjustment payment for barley whose size is subject more to political vagueries than any economic factors.

The negative coefficient on price in the farm marketings of wheat equation appears to be reflecting market demand for the commodity rather than producer's willingness to supply. Since only a negligible quantity of wheat is channelled to the off-Board market, this negative coefficient may indicate restrictive wheat quotas over the estimation period, i.e. producers deliveries were limited to less than the amount they would normally be willing to deliver at the prevailing price, and thus causing supply to equal demand. In the

TABLE 2. SELECT WESTERN CANADIAN ACREAGE ELASTICITIES EVALUATED AT THE MEAN

	Western Canadian Acreages							
	Bread wheat	Durum wheat	Barley	Oats	Rye	Canola	Flaxseed	Summer-fallow
CWB initial wheat price	0.460	-0.194	-0.194	-0.194	-0.194	-0.194	-0.194	-0.194
CWB final wheat price	0.061	-0.026	-0.026	-0.026	-0.026	-0.026	-0.026	-0.026
CWB initial durum price	-0.038	0.866	-0.038	-0.038	-0.038	-0.038	-0.038	-0.038
CWB final durum price	-0.003	0.072	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
CWB initial barley price	-0.056	-0.056	0.327	-0.056	-0.056	-0.056	-0.056	-0.056
Off-board barley price	-0.055	-0.055	0.318	-0.055	-0.055	-0.055	-0.055	-0.055
Off-board oats price	-0.026	-0.026	-0.026	0.425	-0.026	-0.026	-0.026	-0.026
Rye farm price	-0.007	-0.007	-0.007	-0.007	0.617	-0.007	-0.007	-0.007
Canola farm price	-0.062	-0.062	-0.062	-0.062	-0.062	1.027	-0.062	-0.062
Flasxeed farm price	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	0.399	-0.009
Wheat handling costs	-0.013	-0.019	0.007	0.007	0.007	0.007	0.007	0.007
Barley handling costs	0.003	0.003	-0.017	0.003	0.003	0.003	0.003	0.003
Freight rate	-0.016	-0.027	-0.012	0.015	0.015	0.015	0.015	0.015
Crop expenses/acre	0.214	-0.226	-0.299	-0.057	-0.094	-0.194	0.033	-0.194
Wheat yield	1.194	-0.503	-0.503	-0.503	-0.503	-0.503	-0.503	-0.503
Durum yield	-0.090	2.047	-0.090	-0.090	-0.096	-0.090	-0.090	-0.090
Barley yield	-0.325	-0.325	1.885	-0.325	-0.325	-0.325	-0.325	-0.325
Oats yield	-0.115	-0.115	-0.115	1.854	-0.115	-0.115	-0.115	-0.115
Rye yield	-0.021	-0.021	-0.021	-0.021	1.984	-0.021	-0.021	-0.021
Canola yield	-0.119	-0.119	-0.119	-0.119	-0.119	1.986	-0.119	-0.119
Flaxseed yield	-0.041	-0.041	-0.041	-0.041	-0.041	-0.041	1.837	-0.041
Wheat marketings	0.318	-0.134	-0.134	-0.134	-0.134	-0.134	-0.134	-0.134
Durum marketings	-0.020	0.461	-0.020	-0.020	-0.020	-0.020	-0.020	-0.020
Barley marketings	-0.096	-0.096	0.557	-0.096	-0.096	-0.096	-0.096	-0.096
Oats marketings	-0.006	-0.006	-0.006	0.093	-0.006	-0.006	-0.006	-0.006
Canola marketings	-0.031	-0.031	-0.031	-0.031	-0.031	0.525	-0.031	-0.031
Flaxseed marketings	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.127	-0.003
Durum farm stocks	0.012	-0.274	0.012	0.012	0.012	0.012	0.012	0.012
Rye farm stocks	0.001	0.001	0.001	0.001	-0.057	0.001	0.001	0.001
Flaxseed farm stocks	0.004	0.004	0.004	0.004	0.004	0.004	-0.155	0.004

TABLE 3. SELECT EASTERN CANADIAN ACREAGE ELASTICITIES EVALUATED AT THE MEAN

	Eastern Canadian Acreages				
	Wheat	Barley	Oats	Corn	Soybeans
Wheat price	0.278	-0.036	-0.036	-0.036	-0.036
Barley price	-0.020	0.163	-0.020	-0.020	-0.020
Oats price	-0.104	-0.104	0.248	-0.104	-0.104
Corn price	-0.135	-0.135	-0.135	0.228	-0.135
Soybean price	-0.032	-0.032	-0.032	-0.032	0.261

TABLE 4. SELECT WESTERN CANADIAN FARM MARKETING ELASTICITIES EVALUATED AT THE MEAN

	All wheat	Durum Wheat	Barley	Oats	Canola	Flax-seed
Port price	-0.015	0.015			0.281	0.610
Farm or off-Board price			0.296	0.489	-0.281	-0.610
Food and industrial use	0.126		0.059	0.089	0.145	
Exports	0.924	0.704	0.510	0.143	0.295	
Opening farm supplies	0.160	0.259	0.788	1.001	0.720	0.905
Opening commercial stocks	-0.555		-0.276		-0.129	
Quota openess	0.294					
Corn production			-0.233	-0.173		

TABLE 5. SELECT FEED USE ELASTICITIES EVALUATED AT THE MEAN

	Wheat West	Wheat East	Barley West	Barley East	Oats West	Corn
Off-Board wheat price	-0.073	-0.588				
Off-Board barley price	0.229		-0.122	-0.778	1.452	0.346
Off-Board Oats price					-1.979	
Corn price		0.492		0.822		-0.346
Ending barley stocks					-0.106	
Opening supplies	0.318		0.359			
Hog inventories	0.291		0.498	0.659	0.334	0.519
Steer and heifer inventories			0.476	1.590		
Hog-barley price ratio (3rd Qrt)	0.211					
Hog price ratio (3rd Qrt)			0.148	0.075		0.120

TABLE 6. SELECT TRADE ELASTICITIES EVALUATED AT THE MEAN

	Corn exports	Corn imports
Chatham corn price	-4.518	17.113
Chicago corn price		-17.113
Barley price	3.739	0.800
Exchange price	3.488	-17.113
Corn production	1.752	- 0.300
Corn feed use		+ 0.271

TABLE 7. SELECT EXPORT AND ELEVATOR PRICE ELASTICITIES EVALUATED AT THE MEAN

	Export prices			Elevator prices			
	Wheat	Barley	Canola	Flax-see	Corn	Soy-beans	Soy-meal
U.S. wheat price (Cdn $)	1.028						
U.S. corn price (Cdn $)					1.058		
U.S. soybean price (Cdn $)						1.076	
U.S. soymeal price (Cdn $)			0.407				0.920
U.S. soyoil price (Cdn $)			0.779	0.737			
U.S. soymeal to corn price ratio		0.164					
Chatham corn price		0.825					
Vancouver rapeseed price				0.202			
Opening supplies	-0.170	-0.280		-0.196	-0.107	-0.063	
Exports	-0.114		-0.122				

TABLE 8. SELECT CWB INTITIAL PRICE ELASTICITIES EVALUATED AT THE MEAN

	CWB Initial Prices		
	Wheat	Durum	Barley
U.S. wheat price (Cdn $)	0.233		
U.S. corn price (Cdn $)			0.406
Wheat initial price		0.678	
Lagged export price		0.325	0.182
Lagged initial price	0.760		0.377
Stocks to use ratio	-0.046		-0.201

TABLE 9. SELECT OFF-BOARD AND FARM PRICE ELASTICITIES EVALUATED AT THE MEAN

	Thunder Bay		Western Canada				
	Barley	Oats	Wheat	Barley	Oats	Canola	Flax-seed
Initial price	0.047		0.390				
Adjustment payments	0.049		0.050				
Port own price				1.173	0.380	1.067	0.774
Off-Board barley price		0.919	0.590		0.554		
Elevator corn price	0.415						
Farm canola price						0.378	
Opening supplies		-0.176			-0.148	-0.028	-0.041
Closing farm stocks	-0.189		-0.034				
Transportation costs				-0.068		-0.023	

barley and oats equations the problem of the supply of farm marketings equalling the demand does not arise since producers have a viable alternative of delivering to the off-Board market if Board quotas are restrictive.

Barley feed use appears to be more elastic with respect to price and livestock numbers in the East than in the West. This is probably because barley is the predominate feed grain in the West, but in the east faces strong competition from corn. It is interesting to note that the elasticities with respect to hog inventories is the same for barley feed use in Western Canada as it is for corn feed use in Eastern Canada. In the corn feed use equation, corn and barley price elasticities were restricted to equal by entering the prices as a ratio. The own and cross price elasticities in the oats feed use equation are suspiciously high.

A negative coefficient was obtained instead of the expected positive coefficient for hog inventories in the crop year Port to Prairie price transmission equations, but a positive coefficient was obtained in the annual to quarterly price linkage equations. A possible explanation is that within the long run increasing hog inventories are the effect of excess barley supplies, but in the short run they can act as a causal demand agent.

7.0 MODEL VALIDATION

7.1 Intra-Sample Simulation Performance

The grain and oilseed component was historically simulated between the third quarter of 1970 and the second quarter of 1983. Its tracking ability was evaluated on the basis of turning points missed and on the single point criteria of root mean square error (RMSE), and root mean square percent error (RMSPE). The summary statistics for the single point criteria and the number of turning points missed are arrayed by submodel in Table 10. Since the RMSE and RMSPE penalyze large errors

more heavily than small errors, there is a danger that one or two outliers of a variable can unduly negatively bias the performance results. A good example of this is the case of quarterly durum farm marketings which have a reported RMSPE of 104 percent. The model missed two outlier values, one in 1971 by 200 percent and the other in 1976 by 693 percent. If these two observations are omitted, the RMSPE drops to 28 percent, less than one third its original size. For this reason the mean absolute error (MAE) and the mean absolute percent error (MAPE) are presented as well in Table 10. By comparing the MAPE with the RMSPE it is possible to detect whether a large reported RMSPE is caused by the model consistently missing the variable or by an extremely large outlier.

In terms of turning points missed and RMSPE, the model performs better for Eastern Canadian acreages than Western, and out of the Western Canadian acreages performs better for the large crops than the small. In general prices have a lower RMSPE than do the quantity demanded variables and crop year variables track better than quarterly variables. This result corresponds to the block structure of the model since the quantity variables run off the prices, and the quarterly variables run off the crop year variables.

The acreage and each individual commodity submodel by itself was historically simulated over the same period as the whole grain and oilseed component to help isolate the sources of simulation errors. The summary statistics are contained in Appendix K. Since the supply side is closed off in the individual commodity submodels and the demand side and price transmissions are closed off in the acreage submodel, it is possible to form a judgement as to whether the simulation errors in the whole component originate from either the supply equations or the demand and price equations in any one particular submodel.

TABLE 10. INTRA-SAMPLE SIMULATION RESULTS OF THE GRAIN AND OILSEED COMPONENT (1970 3 to 1983 2)

Endogenous variable	Mean	RMS error	RMS % error	Mean absolute error	Mean absolute % error	Turning points missed
Acreage Submodel						
ABA1C	111.07	15.58	14.3	12.89	11.6	7 (58%)
ABA2C	5.26	0.40	7.5	0.31	5.9	2 (17%)
ACO3C	18.83	0.72	4.5	0.58	3.5	2 (17%)
AFL1C	15.87	3.17	18.9	2.65	16.8	5 (42%)
AOA1C	41.89	3.60	8.9	2.95	7.3	4 (33%)
AOA2C	11.60	0.68	5.5	0.59	5.0	0 (0%)
ARA3C	44.14	9.46	24.7	8.06	19.9	4 (33%)
ARY1C	7.46	1.97	28.1	1.56	21.3	6 (50%)
ASF1C	269.86	22.57	8.5	18.67	7.1	8 (67%)
ASO3C	5.37	0.50	9.6	0.40	7.2	3 (25%)
AWB1C	207.33	18.49	9.0	14.04	6.7	3 (25%)
AWD1C	30.96	6.31	26.0	4.68	17.4	3 (25%)
AWH1C	238.29	18.79	7.8	13.95	5.7	4 (33%)
AWH2C	5.34	0.78	12.9	0.59	10.8	3 (25%)
QFEAG3C	51,747.20	2,354.10	4.8	1,911.35	3.7	0 (0%)
Wheat Submodel						
CIWH3C	6.99	1.16	16.4	0.97	13.8	9 (75%)
DDWH3C	1.87	0.04	2.3	0.04	1.9	5 (42%)
DFWH1C	1.25	0.13	11.6	0.11	9.1	5 (42%)
DFWH2C	0.82	0.16	22.2	0.13	16.1	8 (67%)
EXPWH1	161.49	8.85	5.4	6.49	4.2	9 (18%)
EXPWH1C	162.40	5.82	3.3	4.58	2.9	1 (8%)
EXPWH3	157.58	10.41	8.2	7.76	5.7	16 (31%)
FIWH1	13.96	1.33	15.1	1.02	9.6	0 (0%)
FIWH1C	4.55	1.21	62.3	0.98	39.4	3 (25%)
FMWB1	3.65	0.59	19.2	0.47	15.0	3 (6%)
FMWH1	4.14	0.61	16.7	0.48	13.0	3 (6%)
FMWH1C	16.39	1.49	9.8	1.32	8.5	2 (17%)
IWH3C	11.65	1.71	18.3	1.37	13.7	5 (42%)
OPWH1	99.99	12.52	16.4	10.04	12.0	16 (31%)
OPWH1C	99.99	12.04	15.4	9.86	11.6	1 (8%)
QWB1C	15.42	1.31	9.0	1.02	6.7	2 (17%)
QWH1C	17.58	1.37	7.8	1.03	5.8	1 (8%)
QWH2C	0.65	0.10	12.9	0.07	10.8	1 (8%)
XAPWH1C	20.20	8.65	36.6	5.19	19.5	3 (25%)
XIPWH1	117.40	8.08	7.6	6.27	5.9	19 (37%)

- continued -

TABLE 10. INTRA-SAMPLE SIMULATION RESULTS OF THE GRAIN AND OILSEED COMPONENT (1970 3 to 1983 2) (continued)

Endogenous variable	Mean	RMS error	RMS % error	Mean absolute error	Mean absolute % error	Turning points missed
XIPWH1C	105.76	9.67	10.7	7.35	7.8	7 (58%)
XPWH1C	135.07	7.85	8.3	5.68	5.5	1 (8%)
XPWH3	139.18	8.07	4.6	3.39	1.8	8 (16%)
XPWH3C	140.06	5.83	3.4	2.98	1.7	1 (8%)
Durum Submodel						
FIWD1C	0.62	0.37	122.9	0.29	86.3	3 (25%)
FMWD1	0.49	0.12	103.9	0.09	37.0	8 (16%)
FMWD1C	1.96	0.29	15.1	0.25	13.3	3 (25%)
QWD1C	2.17	0.45	26.0	0.33	17.4	5 (42%)
XAPWD1C	26.30	12.44	21.7	6.82	13.3	3 (25%)
XIPWD1	123.73	13.17	10.8	9.11	7.5	20 (39%)
XIPWD1C	107.88	10.36	10.8	7.76	7.9	8 (67%)
XPWD1C	153.05	12.26	8.6	9.72	7.0	1 (8%)
Barley Submodel						
CIBA3C	2.06	0.43	29.0	0.36	21.1	5 (42%)
DFBA1C	4.24	0.30	7.3	0.25	6.1	4 (33%)
DFBA2C	1.70	0.23	13.8	0.19	11.5	6 (50%)
EXPBA3	114.85	13.10	10.8	10.29	9.0	18 (35%)
EXPBA3C	116.75	7.49	6.5	5.39	4.8	2 (17%)
FIBA1	6.84	1.16	21.1	1.00	16.8	0 (0%)
FIBA1C	1.70	0.97	67.1	0.85	56.3	6 (50%)
FMBA1	1.45	0.35	28.0	0.29	21.7	12 (24%)
FMBA1C	5.68	0.46	8.0	0.41	7.2	1 (8%)
IBA3C	3.89	1.11	32.6	0.95	25.6	4 (33%)
OPBA1	80.29	15.59	25.0	12.90	18.9	17 (33%)
OPBA1C	80.29	14.65	22.8	11.01	16.3	4 (33%)
OPBA3	96.35	14.56	18.2	12.81	14.7	12 (24%)
OPBA3C	96.65	12.92	15.8	10.37	11.8	3 (25%)
QBA1C	10.35	1.50	14.3	1.22	11.6	4 (33%)
QBA2C	0.58	0.05	7.5	0.03	5.9	1 (8%)
XAPBA1C	8.03	7.44	78.1	5.19	52.8	4 (33%)
XIPBA1	81.10	8.71	12.1	7.11	9.7	18 (35%)
XIPBA1C	76.77	9.96	14.1	8.05	11.0	3 (25%)
XPBA1C	90.19	9.25	9.7	7.30	8.0	3 (25%)

- continued -

TABLE 10. INTRA-SAMPLE SIMULATION RESULTS OF THE GRAIN AND OILSEED COMPONENT (1970 3 TO 1983 2) (continued)

Endogenous variable	Mean	RMS error	RMS % error	Mean absolute error	Mean absolute % error	Turning points missed
Oats Submodel						
DFOA1C	2.70	0.29	10.9	0.21	8.4	4 (33%)
FIOA1	2.42	0.22	13.3	0.17	9.4	0 (0%)
FIOA1C	0.78	0.19	27.6	0.17	23.5	5 (42%)
FMOA1	0.15	0.04	40.1	0.03	27.6	22 (43%)
FMOA1C	0.58	0.13	27.6	0.11	22.2	5 (42%)
OPOA1	73.28	11.24	18.1	9.43	14.5	14 (27%)
OPOA1C	73.28	10.22	16.4	8.11	12.4	3 (25%)
OPOA3	92.58	12.73	17.3	10.75	13.2	17 (33%)
OPOA3C	92.58	11.00	14.9	8.53	9.0	2 (17%)
QOA1C	3.37	0.28	8.9	0.23	7.3	2 (17%)
QOA2C	0.83	0.05	5.5	0.04	5.0	1 (8%)
Rye Submodel						
FPRY1	92.80	22.11	25.3	17.05	19.7	18 (35%)
QRY1C	0.49	0.14	28.1	0.11	21.3	3 (25%)
Corn Submodel						
DDCO3C	0.86	0.07	8.4	0.06	6.9	4 (33%)
DSCCO3C	3.67	0.13	4.9	0.09	3.1	1 (8%)
EXCO3C	0.32	0.14	574.3	0.11	330.6	5 (42%)
FPCO2	97.85	5.34	6.0	4.50	4.9	5 (10%)
FPCO2C	99.17	3.36	3.6	2.81	3.0	1 (8%)
ICO3C	0.75	0.34	152.0	0.29	106.6	5 (42%)
IMCO3C	0.78	0.23	42.9	0.20	33.8	2 (17%)
QCO3C	4.15	0.16	4.5	0.13	3.5	2 (17%)
Canola Submodel						
CIRA3C	0.54	0.42	116.2	0.38	93.3	2 (17%)
DDRA3C	0.57	0.09	21.2	0.07	15.3	5 (42%)
FIRA3C	0.16	0.34	1126.9	0.30	753.8	2 (17%)
FMRA3	0.43	0.12	36.9	0.10	26.5	19 (37%)
FMRA3C	1.73	0.24	16.2	0.20	12.6	6 (50%)
FPRA1	230.37	30.16	12.6	22.89	9.9	9 (18%)
FPRA1C	230.37	31.54	18.1	22.34	11.5	3 (25%)

- continued -

TABLE 10. INTRA-SAMPLE SIMULATION RESULTS OF THE GRAIN AND OILSEED COMPONENT (1970 3 to 1983 2) (concluded)

Endogenous variable	Mean	RMS error	RMS % error	Mean absolute error	Mean absolute % error	Turning points missed
IRA3C	0.69	0.75	179.2	0.67	139.7	2 (17%)
PRA3	259.70	24.76	9.8	18.21	7.4	10 (20%)
PRA3C	262.55	21.95	9.7	15.30	6.3	2 (17%)
QRA3C	1.97	0.43	24.7	0.36	19.9	5 (42%)
Flaxseed Submodel						
FIFL1C	0.09	0.05	77.6	0.04	59.8	4 (33%)
FMFL1	0.12	0.04	50.3	0.03	33.2	13 (25%)
FMFL1C	0.47	0.08	17.4	0.07	15.7	4 (33%)
FPFL1	246.10	39.97	16.2	33.24	13.8	12 (24%)
FPFL1C	246.10	42.74	19.5	38.17	17.0	4 (33%)
PFL3	275.63	45.49	15.2	37.47	13.3	12 (24%)
PFL3C	278.38	45.32	14.9	37.77	13.3	2 (17%)
QFL1C	0.58	0.12	18.9	0.10	16.8	3 (25%)
Soybean Submodel						
PSM2	221.27	18.10	9.2	11.82	5.8	6 (12%)
PSM2C	221.27	15.69	6.9	10.61	4.7	2 (17%)
PSO21	227.16	7.21	3.1	5.84	2.6	6 (12%)
PSO21C	229.17	5.95	2.5	4.31	1.9	1 (8%)
QSO3C	0.47	0.04	9.6	0.03	7.2	0 (0%)

7.2 Post-Sample Simulation Forecasting Performance

To give an indication of its forecasting ability, the grain and oilseed component was simulated between the third quarter of 1983 and the second quarter of 1984 using actual exogenous data. Unfortunately, this was not a completely ex-post forecast since the 1983 crop year was included in the estimation range of the acreage equations. The forecast results for the crop year variables and the quarterly variables are presented in Tables 11 and 12, respectively.

8.0 MODEL EVALUATION

8.1 Model Assesment

The primary use of the grain and oilseed component in FARM is short and medium term forecasting for Outlook. To this end, the component has reasonable success in predicting both quarterly and crop year prices, but is much weaker in predicting the supply and dispostion of the smaller crops.

The secondary use of the component is policy analysis. Because of this latter use, the model was designed to be sufficiently flexible so that only a minimum number of changes are needed to study any one of a host of policy issues. Unfortunately, the net result of trying to cover off each of the possible issues that might arise, as well as having to provide both quarterly and crop year estimates for the price data is a large model. A large model in some instances can be self-defeating. Instead of simplifying the policy analysis for the intended audience, it can add further complications. The structure of the present component can best handle innately annual policy issues.

TABLE 11. POST-SAMPLE SIMULATION RESULTS OF THE ANNUAL VARIABLES IN THE GRAIN AND OILSEED COMPONENT FOR THE 1983 CROP YEAR

Endogenous variable	Actual value	Predicted value	Percent error	Endogenous variable	Actual value	Predicted value	Percent error
Acreage Submodel							
ABA1C	98.30	103.68	5.5	ASF1C	221.50	209.66	-5.3
ABA2C	9.27	9.18	-1.0	ASO3C	9.00	8.30	-7.8
ACO3C	26.58	28.68	7.9	AWB1C	296.00	302.40	1.9
AFL1C	10.65	10.83	1.7	AWD1C	35.00	44.93	28.4
AOA1C	26.20	23.70	-9.5	AWH1C	331.60	347.31	4.7
AOA2C	8.39	6.96	-17.0	AWH2C	6.87	6.99	1.8
ARA3C	57.50	51.90	-9.7	QFEAG3C	101,130.00	101,838.00	0.7
ARY1C	10.37	9.03	-12.9				
Wheat Submodel							
CIWH3C	7.22	6.73	-6.8	OPWH1C	142.90	142.12	-0.6
DDWH3C	2.02	2.00	-1.0	QWB1C	23.03	23.48	1.9
DFWH1C	1.87	1.33	-28.6	QWH1C	25.68	26.88	4.7
DFWH2C	0.80	1.08	35.0	QWH2C	0.91	0.93	1.8
EXPWH1C	215.21	200.57	-6.8	XAPWH1C	0.00	0.00	0.0
FIWH1C	1.63	4.12	152.8	XIPWH1C	170.00	179.91	5.8
FMWH1C	22.99	22.24	-3.3	XPWH1C	192.34	186.99	-2.8
IWH3C	8.96	10.96	22.3	XPWH3C	213.42	200.57	-6.0
Durum Submodel							
FIWD1C	0.16	0.46	186.6	XAPWD1C	15.00	0.00	-100.00
FMWD1C	2.27	2.72	19.9	XIPWD1C	165.00	172.32	4.4
QWD1C	2.65	3.40	28.4	XPWD1C	187.45	175.47	-6.4
Barley Submodel							
CIBA3C	0.85	1.86	118.8	OPBA1C	104.10	108.39	4.1
DFBA1C	4.46	3.81	-14.6	OPBA3C	130.12	131.77	1.3
DFBA2C	2.69	2.17	-19.3	QBA1C	9.37	9.89	5.5
EXPBA3C	157.83	165.79	5.0	QBA2C	0.92	0.91	-1.0
FIBA1C	0.93	1.72	85.0	XAPBA1C	15.00	0.99	-93.4
FMBA1C	6.66	7.04	5.6	XIPBA1C	95.00	113.22	19.2
IBA3C	1.97	3.77	91.4	XIPBA1C	110.00	119.68	8.8
Oats Submodel							
DFOA1C	2.00	1.94	-3.2	OPOA3C	125.23	129.10	3.1
FIOA1C	0.47	0.28	-40.4	QOA1C	2.16	1.96	-9.5
FMOA1C	0.40	0.44	11.6	QOA2C	0.61	0.50	-17.0
OPOA1C	98.48	101.70	3.3				

- continued -

TABLE 11. POST-SAMPLE SIMULATION RESULTS OF THE ANNUAL VARIABLES IN THE GRAIN AND OILSEED COMPONENT FOR THE 1983 CROP YEAR (concluded)

Endogenous variable	Actual value	Predicted value	Percent error	Endogenous variable	Actual value	Predicted value	Percent error
Rye Submodel							
QRY1C	0.74	0.65	-12.9				
Corn Submodel							
DDC03C	1.16	1.08	-6.9	IC03C	1.00	2.13	113.0
DSCC03C	5.19	5.35	3.1	IMC03C	0.23	1.02	350.2
EXC03C	0.43	0.48	11.6	QC03C	5.93	6.40	7.9
FPC02C	160.22	151.35	-5.5				
Canola Submodel							
CIRA3C	0.10	0.30	200.0	FPRA1C	388.81	377.13	-3.0
DDRA3C	1.16	1.04	-10.3	IRA3C	0.11	0.02	-81.8
FIRA3C	0.02	-0.28	-1,500.00	PRA3C	458.24	410.42	-10.4
FMRA3C	2.22	2.31	4.1	QRA3C	2.68	2.42	-9.7
Flaxseed Submodel							
FIFL1C	0.02	-0.00	-100.00	PFL3C	365.07	433.32	18.7
FMFL1C	0.39	0.41	5.1	QFL1C	0.45	0.45	1.7
FPFL1C	312.50	394.88	26.4				
Soybean Submodel							
PSM2C	308.27	279.66	-9.3	QS03C	0.72	0.67	-7.8
PS021C	357.41	331.97	-7.1				

TABLE 12. POST-SAMPLE SIMULATION RESULTS OF THE QUARTERLY VARIABLES IN T[illegible]RAIN AND OILSEED COMPONENT (1983 3 TO 1984 2)

	Actual Value				Predicted Value				Percent Error			
	1983 3	1983 4	1984 1	1984 2	1983 3	1983 4	1984 1	1984 2	1983 3	1983 4	1984 1	1984 2
Wheat Submodel												
EXPWH1	210.25	209.40	220.59	218.00	198.67	198.13	194.58	201.45	-5.5	-5.4	-11.8	-7.6
EXPWH3	212.82	217.23	218.85	224.58	203.24	204.83	202.67	203.01	-4.5	-5.7	-7.4	-9.6
FIWH1	24.52	18.02	15.07	7.28	24.86	19.31	15.52	8.12	1.4	7.1	3.0	11.7
FMWB1	6.10	5.17	2.27	5.73	6.50	4.54	3.02	5.25	6.4	-12.1	33.0	-8.4
FMWH1	6.74	6.12	2.63	6.24	7.30	5.20	3.44	6.01	8.2	-15.0	31.1	-3.7
OPWH1	137.62	143.92	141.39	148.69	129.94	139.71	140.88	149.04	-5.6	-2.9	-0.4	0.2
XIPWH1	171.50	170.00	170.00	170.00	178.11	179.91	179.91	179.91	3.9	5.8	5.8	5.8
XPWH3	207.52	210.40	218.07	214.62	198.67	198.13	194.58	201.45	-4.3	-5.8	-10.8	-6.1
Durum Submodel												
FMWD1	0.64	0.96	0.36	0.52	0.80	0.66	0.42	0.77	25.1	-30.9	19.4	48.4
XIPWD1	168.17	165.00	165.00	180.00	173.05	172.32	172.32	172.32	2.9	4.4	4.4	-4.3
Barley Submodel												
EXPBA3	140.95	146.14	169.85	162.71	158.11	169.18	162.36	176.54	12.2	15.8	-4.4	8.5
FIBA1	11.48	8.20	5.81	3.32	11.73	8.76	6.25	3.10	2.2	6.8	7.6	-6.7
FMBA1	1.92	2.36	1.53	1.44	1.91	1.95	1.48	1.94	-0.1	-17.4	-3.4	34.7
OPBA1	86.54	106.23	108.62	115.00	98.05	109.01	109.93	114.59	13.3	2.6	1.2	-0.4
OPBA3	112.53	131.93	129.15	136.04	120.51	135.85	131.95	138.15	7.1	3.0	2.2	1.6
XIPBA1	100.00	110.00	110.00	110.00	112.15	113.51	113.86	114.21	12.1	3.2	3.5	3.8
Oats Submodel												
FIOA1	2.65	1.97	1.27	0.68	2.43	1.71	1.07	0.40	-8.3	-13.3	-15.9	-40.7
FMOA1	0.11	0.14	0.11	0.11	0.06	0.19	0.09	0.11	-49.4	37.2	-12.8	0.0
OPOA1	80.85	100.31	102.15	110.62	87.56	105.68	106.58	106.08	8.3	5.4	4.3	-4.1
OPOA3	106.56	127.09	128.88	138.41	112.11	134.87	133.34	132.35	5.2	6.1	3.5	-4.4
Rye Submodel												
FPRY1	100.08	110.00	101.92	112.69	123.18	134.98	135.83	140.09	23.1	22.7	33.3	24.3
Corn Submodel												
FPCO2	160.44	152.93	150.05	171.09	148.56	150.76	147.45	161.34	-7.4	-1.4	-1.7	-5.7
Canola Submodel												
FMRA3	0.50	0.84	0.75	0.31	0.63	0.62	0.52	0.64	26.8	-26.5	-30.1	106.5
FPRA1	327.15	359.00	376.23	492.85	386.46	374.02	384.24	455.46	18.1	4.2	2.1	-7.6
PRA3	370.63	402.85	414.76	568.21	423.60	404.26	418.32	489.38	14.3	0.4	0.9	-13.9
Flaxseed Submodel												
FMFL1	0.24	0.15	0.06	0.06	0.18	0.20	0.07	0.08	-23.8	35.5	2.1	29.5
FPFL1	290.46	319.39	313.46	326.69	344.60	421.98	412.42	454.02	18.6	32.1	31.6	39.0
PFL3	348.98	373.79	362.33	359.09	384.26	465.65	446.79	494.99	10.1	24.6	23.3	37.8
Soybean Submodel												
PSM2	316.59	325.74	300.45	290.28	320.60	325.11	286.97	280.61	1.3	-0.2	-4.5	-3.3
PSO21	351.38	356.52	340.45	373.69	325.49	356.01	330.04	358.00	-7.4	-0.1	-3.1	-4.2

8.2 SUGGESTED AREAS FOR IMPROVEMENT

This technical bulletin has presented a glimpse of the grain and oilseed component at a single moment in time. It is continually being revised, as any working model must be, to reflect the changing institutional and political enviornment in which the grain and oilseed industry operates as well as to imporve the structure. Equations need to be developed which explain total areas seeded, yields, and exports. The latter will be difficult to develop without combining the component to an international model. Further work needs to be done on improving the acreage forecasts for the smaller Western crops. The Eastern Canadian acreage multinomial logit model needs to be re-estimated taking into account the antoregressive autocorelation in the individual equations. The quarterly marketing equations appear to be inadequate.

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APPENDIX A

MODEL: ACREAGE

SYMBOL DECLARATIONS

ENDOGENOUS:

ABA1C	- BARLEY ACREAGE, WESTERN CANADA (00,000 ACRES)
ABA2C	- BARLEY ACREAGE, EASTERN CANADA (00,000 ACRES)
ACO3C	- CORN ACREAGE, CANADA (00,000 ACRES)
AFL1C	- FLAXSEED ACREAGE, WESTERN CANADA (00,000 ACRES)
AOA1C	- OATS ACREAGE, WESTERN CANADA (00,000 ACRES)
AOA2C	- OATS ACREAGE, EASTERN CANADA (00,000 ACRES)
ARA3C	- CANOLA ACREAGE, CANADA (00,000 ACRES)
ARY1C	- RYE ACREAGE, WESTERN CANADA (00,000 ACRES)
ASF1C	- SUMMERFALLOW ACREAGE, WESTERN CANADA (00,000 ACRES)
ASO3C	- SOYBEAN ACREAGE, CANADA (00,000 ACRES)
AWB1C	- BREAD WHEAT ACREAGE, WESTERN CANADA (00,000 ACRES)
AWD1C	- DURUM ACREAGE, WESTERN CANADA (00,000 ACRES)
AWH1C	- WHEAT ACREAGE, WESTERN CANADA (00,000 ACRES)
AWH2C	- WHEAT ACREAGE, EASTERN CANADA (00,000 ACRES)
QFEAG3C	- CROP PRODUCTION COST, CANADA ($/T)

EXOGENOUS:

AREA1C	- WHEAT, BARLEY, OATS, RYE, CANOLA, FLAXSEED AND SUMMERFALLOW ACREAGE, WESTERN CANADA (00,000 ACRES)
AREA2C	- WHEAT, BARLEY, OATS, CORN, AND SOYBEAN ACREAGE, EASTERN CANADA (00,000 ACRES)
CROW	- TRANSPORTATION COSTS, SCOTT SASKATCHEWAN TO PORT ($/T)
DLIFT	- DUMMY VARIABLES FOR LOWER INVENTORIES FOR TOMORROW (LIFT) PROGRAM
DQUEBEC	- DUMMY VARIABLE FOR SUDDEN INCREASE IN QUEBEC BARLEY ACREAGE
DWKILL	- DUMMY VARIABLES FOR WINTER KILL OF ONTARIO WHEAT
EXPWH1	- WHEAT QUARTERLY CWB ASKING PRICE, NO 1 CWRS 13.5%, THUNDER BAY ($/T)
FEFERT3A	- FERTILIZER AND LIME FARM OPERATING EXPENSES, CANADA (MIL $)
FEMACH3A	- TOTAL MACHINERY FARM OPERATING EXPENSES, CANADA (MIL $)
FEMISC3A	- INSURANCE, FENCING, CUSTOM WORK, HEATING FUEL, STABILIZATION LEVIES AND OTHER FARM OPERATING EXPENSES, CANADA (MIL $)
FEOCR3A	- OTHER CROP FARM OPERATING EXPENSES, CANADA (MIL $)
FIFL1C	- FLAXSEED CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FIRY1C	- RYE CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FIWD1C	- DURUM CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FMBA1	- BARLEY QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMFL1	- FLAXSEED QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMOA1	- OATS QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMRA3	- CANOLA QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMWB1	- BREAD WHEAT QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMWD1	- DURUM QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FPCO2	- CORN QUARTERLY ELEVATOR PRICE, CHATHAM ($/T)
FPFL1	- FLAXSEED QUARTERLY FARM PRICE, WESTERN CANADA ($/T)
FPRA1	- CANOLA QUARTERLY FARM PRICE, WESTERN CANADA ($/T)
FPRY1	- RYE QUARTERLY FARM PRICE, WESTERN CANADA ($/T)
HCBA3C	- BARLEY PRIMARY ELEVATOR TARIFF, WESTERN CANADA ($/T)
HCWH3C	- WHEAT PRIMARY ELEVATOR TARIFF, WESTERN CANADA ($/T)
IHG1	- PIGS QUARTERLY CLOSING NUMBER ON FARMS, WESTERN CANADA (000)

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JS3      - SEASONAL DUMMY VARIABLE FOR THIRD QUARTER
OPBA1    - BARLEY QUARTERLY OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPBA3    - BARLEY QUARTERLY OFF-BOARD PRICE, THUNDER BAY ($/T)
OPOA1    - OATS QUARTERLY OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPOA3    - OATS QUARTERLY OFF-BOARD PRICE, THUNDER BAY ($/T)
PSO21    - SOYBEAN QUARTERLY ELEVATOR PRICE, CHATHAM ($/T)
TIMEC    - TIME TREND - CONSTANT AFTER 1984 2
XIPBA1   - BARLEY QUARTERLY INITIAL PRICE + ADJUSTMENTS, NO 1 FEED, THUNDER BAY ($/T)
XIPWD1   - DURUM QUARTERLY INITIAL PRICE + ADJUSTMENTS, NO 1 CWAD, THUNDER BAY ($/T)
XIPWH1   - WHEAT QUARTERLY INITIAL PRICE + ADJUSTMENTS, NO 1 CWRS, THUNDER BAY ($/T)
XPWD1C   - DURUM FINAL PRICE, NO 1 CWAD, THUNDER BAY ($/T)
XPWH1C   - WHEAT FINAL PRICE, NO 1 CWRS, THUNDER BAY ($/T)
YBA1C    - BARLEY YIELD, WESTERN CANADA (KG/ACRE)
YFL1C    - FLAXSEED YIELD, WESTERN CANADA (KG/ACRE)
YOA1C    - OATS YIELD, WESTERN CANADA (KG/ACRE)
YRA3C    - CANOLA YIELD, CANADA (KG/ACRE)
YRY1C    - RYE YIELD, WESTERN CANADA (KG/ACRE)
YWB1C    - BREAD WHEAT YIELD, WESTERN CANADA (KG/ACRE)
YWD1C    - DURUM WHEAT YIELD, WESTERN CANADA (KG/ACRE)

POLICY:
   BABA1C  BABA2C  BAC03C  BAFL1C  BAOA1C  BAOA2C  BARA3C  BARY1C  BASF1C  BAS03C  BAWB1C  BAWD1C  BAWH1C  BAWH2C
   BQFEAG3C

COEFFICIENT:
   AB.0  AB.1  AB.3  AB.4  AB.9  AB2.0  AB2.1  AB2.2  AB2.3  AC.0  AC.1  AC.2  AC.3  AC.4  AC.9  AC2.0  AC2.1  AC2.2
   AD.0  AD.1  AD.2  AD.3  AD.4  AD.5  AD.9  AF.0  AF.1  AF.2  AF.3  AF.4  AF.9  AO.0  AO.1  AO.2  AO.3  AO.4  AO.9
   AO2.0  AO2.1  AO2.2  AR.0  AR.1  AR.2  AR.3  AR.9  AS.0  AS.1  AS.2  AS.3  AS2.0  AS2.1  AS2.2  AW.1  AW.2  AW.3
   AW.4  AW.5  AW.9  AW2.1  AW2.2


EQUATIONS


     CROP PRODUCTION COSTS, CANADA:
1:       QFEAG3C = BQFEAG3C+10000*(FEMACH3A(-3)+FEFERT3A(-3)+FEOCR3A(-3)+FEMISC3A(-3))/SUM(I = -4 TO -1 : AREA1C(I)
         -ASF1C(I))

     SUMMERFALLOW ACREAGE, WEST (1968-1983) MULTINOMIAL LOGIT MODEL:
2:       ASF1C = BASF1C+JS3*AWB1C*EXP(AS.0+AS.1*QFEAG3C/10000+AS.2*TIMEC+AS.3*DLIFT+AW.1*(XIPWH1-HCWH3C(-4)-CROW)+
         AW.9*QFEAG3C/(SUM(I = -12 TO -1 : YWB1C(I))/3)+AW.2*(XPWH1C(-3)-XIPWH1(-5))+AW.3*(FMWB1(-2)+FMWB1(-3)))

     BREAD WHEAT ACREAGE, WEST (1968-1983) MULTINOMIAL LOGIT MODEL:
3:       AWB1C = BAWB1C+JS3*(AREA1C-AWD1C-ABA1C-AOA1C-ARY1C-ARA3C-AFL1C-ASF1C)

     WHEAT ACREAGE, WEST:
4:       AWH1C = BAWH1C+AWD1C+AWB1C

     WHEAT ACREAGE, EAST:
5:       AWH2C = BAWH2C+JS3*(AREA2C-ABA2C-AOA2C-AS03C-AC03C)

     DURUM ACREAGE, WEST (1968-1983) MULTINOMIAL LOGIT MODEL:
6:       AWD1C = BAWD1C+AWB1C*EXP(AD.0+AD.1*(XIPWD1-HCWH3C(-4)-CROW)+AD.9*QFEAG3C/(SUM(I = -12 TO -1 : YWD1C(I))/3)
         +AD.2*(XPWD1C(-3)-XIPWD1(-5))+AD.3*(FMWD1(-2)+FMWD1(-3))+AD.4*FIWD1C(-4)+AD.5*DLIFT+AW.1*(XIPWH1-HCWH3C(-4
         )-CROW)+AW.9*QFEAG3C/(SUM(I = -12 TO -1 : YWB1C(I))/3)+AW.2*(XPWH1C(-3)-XIPWH1(-5))+AW.3*(FMWB1(-2)+FMWB1(
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        -3))+AW.5*TIMEC)

  BARLEY ACREAGE, WEST (1968-1983) MULTINOMIAL LOGIT MODEL:
7:      ABA1C = BABA1C+JS3*AWB1C*EXP(AB.0+AB.1*(0.5*(XIPBA1-HCBA3C(-4)-CROW)+0.5*OPBA1(-2))+AB.9*QFEAG3C/(SUM(I =
        -12 TO -1 : YBA1C(I))/3)+AB.3*(FMBA1(-2)+FMBA1(-3))+AB.4*IHG1(-2)+AW.1*(XIPWH1-HCWH3C(-4)-CROW)+AW.9*
        QFEAG3C/(SUM(I = -12 TO -1 : YWB1C(I))/3)+AW.2*(XPWH1C(-3)-XIPWH1(-5))+AW.3*(FMWB1(-2)+FMWB1(-3))+AW.4*
        DLIFT+AW.5*TIMEC)

  BARLEY ACREAGE, EAST (1967-1983) MULTINOMIAL LOGIT MODEL:
8:      ABA2C = BABA2C+JS3*AWH2C*EXP(AB2.0+AB2.1*OPBA3(-2)+AB2.2*DQUEBEC+AB2.3*TIMEC+AW2.1*EXPWH1(-2)+AW2.2*DWKILL
        )

  OATS ACREAGE, WEST (1968-1983) MULTINOMIAL LOGIT MODEL:
9:      AOA1C = BAOA1C+JS3*AWB1C*EXP(AO.0+AO.1*OPOA1(-2)+AO.9*QFEAG3C/(SUM(I = -12 TO -1 : YOA1C(I))/3)+AO.2*(
        FMOA1(-2)+FMOA1(-3))+AO.3*DLIFT+AO.4*TIMEC+AW.1*(XIPWH1-HCWH3C(-4)-CROW)+AW.9*QFEAG3C/(SUM(I = -12 TO -1
         : YWB1C(I))/3)+AW.2*(XPWH1C(-3)-XIPWH1(-5))+AW.3*(FMWB1(-2)+FMWB1(-3)))

  OATS ACREAGE, EAST (1967-1983) MULTINOMIAL LOGIT MODEL:
10:     AOA2C = BAOA2C+JS3*AWH2C*EXP(AO2.0+AO2.1*OPOA3(-2)+AO2.2*TIMEC+AW2.1*EXPWH1(-2)+AW2.2*DWKILL)

  RYE ACREAGE, WEST (1968-1983) MULTINOMIAL LOGIT MODEL:
11:     ARY1C = BARY1C+JS3*AWB1C*EXP(AR.0+AR.1*FPRY1(-5)+AR.9*QFEAG3C/(SUM(I = -12 TO -1 : YRY1C(I))/3)+AR.2*DLIFT
        (-4)+AR.3*FIRY1C(-8)+AW.1*XIPWH1+AW.9*QFEAG3C/(SUM(I = -12 TO -1 : YWB1C(I))/3)+AW.2*(XPWH1C(-3)-XIPWH1(-5
        ))+AW.3*(FMWB1(-2)+FMWB1(-3))+AW.4*DLIFT+AW.5*TIMEC)

  CORN ACREAGE, CANADA (1967-1983) MULTINOMIAL LOGIT MODEL:
12:     ACO3C = BACO3C+JS3*AWH2C*EXP(AC2.0+AC2.1*FPCO2(-2)+AC2.2*TIMEC+AW2.1*EXPWH1(-2)+AW2.2*DWKILL)

  CANOLA ACREAGE, CANADA (1968-1983) MULTINOMIAL LOGIT MODEL:
13:     ARA3C = BARA3C+JS3*AWB1C*EXP(AC.0+AC.1*FPRA1(-2)+AC.9*QFEAG3C/(SUM(I = -12 TO -1 : YRA3C(I))/3)+AC.2*DLIFT
        +AC.3*DLIFT(-4)+AC.4*(FMRA3(-2)+FMRA3(-3))+AW.1*(XIPWH1-HCWH3C(-4)-CROW)+AW.9*QFEAG3C/(SUM(I = -12 TO -1
         : YWB1C(I))/3)+AW.2*(XPWH1C(-3)-XIPWH1(-5))+AW.3*(FMWB1(-2)+FMWB1(-3))+AW.5*TIMEC)

  FLAXSEED ACREAGE, WEST (1968-1983) MULTINOMIAL LOGIT MODEL:
14:     AFL1C = BAFL1C+JS3*AWB1C*EXP(AF.0+AF.1*FPFL1(-2)+AF.9*QFEAG3C/(SUM(I = -12 TO -1 : YFL1C(I))/3)+AF.2*DLIFT
        +AF.3*FIFL1C(-4)+AF.4*(FMFL1(-2)+FMFL1(-3))+AW.1*(XIPWH1-HCWH3C(-4)-CROW)+AW.9*QFEAG3C/(SUM(I = -12 TO -1
         : YWB1C(I))/3)+AW.2*(XPWH1C(-3)-XIPWH1(-5))+AW.3*(FMWB1(-2)+FMWB1(-3))+AW.5*TIMEC)

  SOYBEAN ACREAGE, CANADA (1967-1983) MULTINOMIAL LOGIT MODEL:
15:     ASO3C = BASO3C+JS3*AWH2C*EXP(AS2.0+AS2.1*PSO21(-2)+AS2.2*TIMEC+AW2.1*EXPWH1(-2)+AW2.2*DWKILL)
```

APPENDIX A. ESTIMATION RESULTS OF THE MULTINOMINAL LOGIT MODEL FOR WESTERN CANADIAN ACREAGES (1968 3 TO 1983 2)

	AWB1C	AWD1C	ABA1C	AOA1C	ARY1C	ARA3C	AFL1C	ASF1C
Intercept		-1.8853	-0.8040	-0.7356	-2.9536	-2.3103	-2.1356	-0.6266
		(-12.38)	(-5.88)	(-6.16)	(-19.36)	(-17.18)	(-12.67)	(-3.00)
X1PWH1-HCWH3C(-4)-CROW	0.0061							
	(8.03)							
XPWH1C(-3)-X1PWH1(-5)	0.0054							
	(5.60)							
QFEAG3C/(SUM(I=-12TO-1:YWB1C(I))/3)	-0.0234							
	(-11.66)							
FMWB1(-2)+FMWB1(-3)	0.0781							
	(13.64)							
X1PWD1-HCWH3C(-4)-CROW		0.0082						
		(6.33)						
XPWD1C(-3)-X1PWD1(-5)		0.0030						
		(3.85)						
QFEAG3C/(SUM(I=-12TO-1:YWD1C(I))/3)		-0.275						
		(-10.33)						
FMWD1(-2)+FMWD1(-3)		0.6803						
		(5.77)						
F1WD1C(-4)		-0.4665						
		(-13.08)						
0.5*(X1PBA1-HCBA3C(-4)-CROW)+0.5*OPBA1(-2)			0.0051					
			(15.98)					
QFEAG3C/(SUM(I=-12TO-1:YBA1C(I))/3)			-0.0383					
			(-12.61)					
FMBA1(-2)+FMBA1(-3)			0.2724					
			(11.44)					
1HG1(-2)			8.72 E-07					
			(0.04)					
OPOA1(-2)				0.0066				
				(10.23)				
QFEAG3C/(SUM(I=-12TO-1:YOA1C(I))/3)				-0.0299				
				(-13.02)				
FMOA1(-2)+FMOA1(-3)				0.3324				
				(3.56)				
FPRY1(-5)					0.0080			
					(3.75)			
QFEAG3C/(SUM(I=-12TO-1:YRY1C(I))/3)					-0.0233			
					(-6.84)			
F1RY1C(-8)					-0.3966			
					(-1.54)			
FPRA1(-2)						0.0053		
						(14.98)		
QFEAG3C/(SUM(I=-12TO-1:YRA3C(I))/3)						-0.0175		
						(-11.62)		
FMRA3(-2)+FMRA3(-3)						0.7274		
						(12.50)		

- continued -

APPENDIX A. ESTIMATION RESULTS OF THE MULTINOMINAL LOGIT MODEL FOR WESTERN CANADIAN ACREAGES (1968 3 TO 1983 2) (Concluded)

	AWB1C	AWD1C	ABA1C	AOA1C	ARY1C	ARA3C	AFL1C	ASF1C
FPFL1(-2)							0.0018	
QFEAG3C/(SUM(I=-12TO-1:YFL1C(I))/3)							(6.11)	
FMFL1(-2)+FMFL1(-3)							-0.0125	
FIFL1C(-4)							(-10.37)	
QFEAG3C/10,000							0.5373	
DLIFI		1.1170		0.7295		1.1350	(1.87)	-0.3715
DLIFI(-4)		(8.90)		(14.08)		(12.76)	-2.0277	(-11.22)
TIMEC	-0.0127			-0.0032	0.7453	0.3936	(-5.02)	0.8199
	(1.76)			(-0.51)	(8.30)	(5.92)	1.3213	(14.08)
							(11.48)	0.0825
								(7.22)
R^2		0.6703	0.9736	0.9800	0.5386	0.8358	0.8536	0.9508
SSR		0.5295	0.0384	0.0711	0.7358	0.7525	0.8401	0.1081
DW		1.83	2.41	1.04	1.53	2.16	1.61	1.58

ESTIMATION RESULTS OF THE MULTINOMINAL LOGIT MODEL FOR EASTERN CANADIAN ACREAGES (1967 3 TO 1983 2)

	AWH2C	ABA2C	AOA2C	ACO3C	ASO3C
Intercept		-0.1203	3.2644	0.0134	-1.1164
		(-0.47)	(16.87)	(0.06)	(-4.26)
EXPWH1(-2)	0.0022				
	(2.32)				
DWKILL	0.3636				
	(4.26)				
OPBA3(-2)		0.0021			
		(1.43)			
DQUEBEC		0.5217			
		(7.54)			
OPOA3(-2)			0.0041		
			(3.26)		
FPCO2(-2)				0.0042	
				(3.50)	
PSO21(-2)					0.0015
					(2.24)
TIMEC		0.0032	-0.0949	0.0410	0.0398
		(0.24)	(-8.96)	(3.34)	(2.64)
R^2		0.7013	0.9344	0.7823	0.7316
SSR		0.4473	0.2463	0.2988	0.4659
DW		1.03	0.83	0.91	0.78

APPENDIX B

MODEL: WHEAT

SYMBOL DECLARATIONS

ENDOGENOUS:

CIWH3C - WHEAT CLOSING CROP YEAR COMMERCIAL INVENTORIES, CANADA (MIL T)
DDWH3C - WHEAT CROP YEAR FOOD + INDUSTRIAL DISAPPEARANCE, CANADA (MIL T)
DFWH1C - WHEAT CROP YEAR FEED, WASTE AND DOCKAGE DISAPPEARANCE, WESTERN CANADA (MIL T)
DFWH2C - WHEAT CROP YEAR FEED, WASTE AND DOCKAGE DISAPPEARANCE, EASTERN CANADA (MIL T)
EXPWH1 - WHEAT QUARTERLY CWB ASKING PRICE, NO 1 CWRS 13.5%, THUNDER BAY ($/T)
EXPWH1C - WHEAT CROP YEAR CWB ASKING PRICE, NO 1 CWRS 13.5%, THUNDER BAY ($/T)
EXPWH3 - WHEAT QUARTERLY UNIT VALUE EXPORT PRICE, CANADA ($/T)
FIWH1 - WHEAT CLOSING QUARTERLY FARM INVENTORIES, WESTERN CANADA (MIL T)
FIWH1C - WHEAT CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FMWB1 - BREAD WHEAT QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMWD1 - DURUM QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMWH1 - WHEAT QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMWH1C - WHEAT CROP YEAR FARM MARKETINGS, WESTERN CANADA (MIL T)
IWH3C - WHEAT CLOSING CROP YEAR INVENTORIES (MIL T)
OPWH1 - WHEAT QUARTERLY OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPWH1C - WHEAT CROP YEAR OFF-BOARD PRICE, WESTERN CANADA ($/T)
QWB1C - BREAD WHEAT PRODUCTION, WESTERN CANADA (MIL T)
QWH1C - WHEAT PRODUCTION, WESTERN CANADA (MIL T)
QWH2C - WHEAT PRODUCTION, EASTERN CANADA (MIL T)
XAPWH1C - WHEAT CWB ADJUSTMENT PAYMENTS, NO 1 CWRS, THUNDER BAY ($/T)
XIPWH1 - WHEAT CWB INITIAL PRICE + ADJUSTMENTS, NO 1 CWRS, THUNDER BAY ($/T)
XIPWH1C - WHEAT CWB INITIAL PRICE, NO 1 CWRS, THUNDER BAY ($/T)
XPWH1C - WHEAT CWB FINAL PRICE, NO 1 CWRS, THUNDER BAY ($/T)
XPWH3 - WHEAT QUARTERLY DOMESTIC MILL PRICE, THUNDER BAY ($/T)
XPWH3C - WHEAT CROP YEAR DOMESTIC MILL PRICE, THUNDER BAY ($/T)

EXOGENOUS:

AWB1C - BREAD WHEAT ACREAGE, WESTERN CANADA (00,000 ACRES)
AWH2C - WHEAT ACREAGE, EASTERN CANADA (00,000 ACRES)
CROW - TRANSPORTATION COSTS, SCOTT SASKATCHEWAN TO PORT ($/T)
DLIFT - DUMMY VARIABLE FOR LOWER INVENTORIES FOR TOMORROW (LIFT) PROGRAM
DSCWH3C - WHEAT CROP YEAR SEED DISAPPEARANCE + LOSS IN HANDLING - IMPORTS, CANADA (MIL T)
DSWH1C - WHEAT CROP YEAR SEED DISAPPEARANCE, WESTERN CANADA (MIL T)
DU74 - DUMMY VARIABLE FOR BAD WEATHER IN 1974
ER34 - QUARTERLY EXCHANGE RATE (CDN $/US $)
ER34C - CROP YEAR EXCHANGE RATE (CDN $/US $)
EXPWH4 - WHEAT QUARTERLY EXPORT PRICE, NO 1 HRW, US GULF (US $/T)
EXPWH4C - WHEAT CROP YEAR EXPORT PRICE, NO 1 HRW, US GULF (US $/T)
EXWH3C - WHEAT CROP YEAR EXPORTS, CANADA (MIL T)
FIWH2C - WHEAT CLOSING CROP YEAR FARM INVENTORIES, EASTERN CANADA (MIL T)
FPCO2C - CORN CROP YEAR ELEVATOR PRICE, CHATHAM ($/T)
IHG1 - PIGS QUARTERLY CLOSING NUMBER ON FARMS, WESTERN CANADA (000)
JS1 - SEASONAL DUUMY VARIABLE FOR FIRST QUARTER
JS2 - SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
JS3 - SEASONAL DUMMY VARIABLE FOR THIRD QUARTER

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JS4       - SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
OPBA1     - BARLEY QUARTERLY OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPBA1C    - BARLEY CROP YEAR OFF-BOARD PRICE, WESTERN CANADA ($/T)
PHG1      - HOGS QUARTERLY PRICE, INDEX 100, EDMONTON ($/CWT)
POPN3     - POPULATION, CANADA (MIL)
QWD1C     - DURUM PRODUCTION, WESTERN CANADA (MIL T)
TIME      - TIME TREND
YEARQ     - QUARTERLY TREND VARIABLE
YWB1C     - BREAD WHEAT YIELD, WESTERN CANADA (KG/ACRE)
YWH2C     - WHEAT YIELD, EASTERN CANADA (KG/ACRE)

POLICY:
   BCIWH3C  BDDWH3C  BDFWH1C  BDFWH2C  BEXPWH1  BEXPWH1C  BEXPWH3  BFIWH1  BFIWH1C  BFMWB1  BFMWH1  BFMWH1C  BIWH3C
   BOPWH1  BOPWH1C  BQWB1C  BQWH1C  BQWH2C  BXAPWH1C  BXIPWH1  BXIPWH1C  BXPWH1C  BXPWH3  BXPWH3C

COEFFICIENT:
   DDWH3C.0  DDWH3C.1  DDWH3C.2  DFWH1C.0  DFWH1C.1  DFWH1C.2  DFWH1C.3  DFWH1C.4  DFWH1C.5  DFWH1C.6  DFWH2C.0
   DFWH2C.1  DFWH2C.2  DFWH2C.3  EXPWHC.0  EXPWHC.1  EXPWHC.2  EXPWHC.3  EXPWH1.1  EXPWH1.2  EXPWH1.3  EXPWH1.4
   EXPWH1.5  EXPWH1.6  EXPWH3.1  EXPWH3.2  EXPWH3.5  EXPWH3.6  EXPWH3.7  EXPWH3.8  FIWH1.0  FIWH1.1  FIWH1.2  FIWH1.3
   FMWH1.1  FMWH1.10  FMWH1.11  FMWH1.13  FMWH1.15  FMWH1.17  FMWH1.19  FMWH1.2  FMWH1.3  FMWH1.4  FMWH1.5  FMWH1.6
   FMWH1.7  FMWH1.8  FMWH1.9  FMWH1C.0  FMWH1C.1  FMWH1C.2  FMWH1C.3  FMWH1C.4  OPWH1.1  OPWH1.2  OPWH1.3  OPWH1.4
   OPWH1.5  OPWH1.6  OPWH1C.0  OPWH1C.2  OPWH1C.3  OPWH1C.5  OPWH1C.6  XAPWHC.0  XAPWHC.1  XAPWHC.2  XIPWHC.0  XIPWHC.2
   XIPWHC.3  XIPWHC.4  XIPWH1.0  XIPWH1.1  XPWH1C.1


EQUATIONS


    BREAD WHEAT PRODUCTION, WEST:
 1:     QWB1C = BQWB1C+AWB1C*YWB1C/10000

    WHEAT PRODUCTION, WEST:
 2:     QWH1C = BQWH1C+QWB1C+QWD1C

    WHEAT PRODUCTION, EAST:
 3:     QWH2C = BQWH2C+AWH2C*YWH2C/10000

    WHEAT FARM MARKETINGS, WEST (1967Q3-1983Q2):
 4:     FMWH1C = BFMWH1C+JS3*(FMWH1C.0+FMWH1C.1*(DDWH3C+EXWH3C-CIWH3C(-4))+FMWH1C.2*EXPWH1C+FMWH1C.3*(QWH1C+FIWH1C
        (-4))+FMWH1C.4*CIWH3C/SUM(I = -3 TO 0 : EXWH3C(I)+DDWH3C(I)))

    WHEAT FARM MARKETINGS, WEST (1969Q3-1983Q2):
 5:     FMWH1 = BFMWH1+JS3*(0.965*(FIWH1(-1)-FIWH1C(-4))+(FMWH1.1+FMWH1.2*CIWH3C(-4)+FMWH1.3*EXWH3C+FMWH1.4*(0.96
        *(FIWH1(-1)-FIWH1C(-4)))+FMWH1.5*(XIPWH1C-XIPWH1(-1))+FMWH1.6*(QWH1C+FIWH1C(-4))+FMWH1.7*DLIFT))+JS4*(
        FMWH1.8+FMWH1.9*CIWH3C(-5)+FMWH1.10*FMWH1C(-1)+FMWH1.11*(XIPWH1-XIPWH1C(-1)))+JS1*(FMWH1.13*(FMWH1C(-2)-
        FMWH1(-1)-FMWH1(-2)+0.965*(FIWH1(-3)-FIWH1C(-6)))+FMWH1.15*(XIPWH1-XIPWH1(-1)))+JS2*(FMWH1.17*(FMWH1C(-3)-
        FMWH1(-1)-FMWH1(-2)-FMWH1(-3)+0.965*(FIWH1(-4)-FIWH1C(-7)))+FMWH1.19*(XIPWH1-XIPWH1(-1)))

    BREAD WHEAT FARM MARKETINGS, WEST:
 6:     FMWB1 = BFMWB1+FMWH1-FMWD1

    WHEAT FOOD + INDUSTRIAL USE, CANADA (1967Q3-1983Q2):
 7:     DDWH3C = BDDWH3C+JS3*(DDWH3C.0+DDWH3C.1*XPWH3C+DDWH3C.2*POPN3)

    WHEAT FEED USE, WEST (1967Q3-1983Q2):
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 8:      DFWH1C = BDFWH1C+JS3*(DFWH1C.0+DFWH1C.1*OPWH1C+DFWH1C.2*DU74+DFWH1C.6*PHG1/OPBA1+DFWH1C.3*IHG1+DFWH1C.4*
         OPBA1C+DFWH1C.5*(QWH1C+FIWH1C(-4)))

   WHEAT FEED USE, EAST (1968Q3-1983Q2):
 9:      DFWH2C = BDFWH2C+JS3*(DFWH2C.0+DFWH2C.1*(OPWH1C+CROW)+DFWH2C.2*FPC02C+DFWH2C.3*TIME)

   WHEAT CLOSING FARM STOCKS, WEST:
10:      FIWH1C = BFIWH1C+JS3*(QWH1C+FIWH1C(-4)-FMWH1C-DFWH1C-DSWH1C)

   WHEAT CLOSING FARM STOCKS, WEST (1969Q3-1983Q2):
11:      FIWH1 = BFIWH1+(IF JS3 EQ 1 THEN QWH1C+FIWH1(-1)-FMWH1+FIWH1.0*DFWH1C ELSE FIWH1(-1)-FMWH1+FIWH1.1*JS4*
         DFWH1C(-1)+FIWH1.2*JS1*DFWH1C(-2)+FIWH1.3*JS2*DFWH1C(-3)-JS2*DSWH1C(-3))

   WHEAT CLOSING COMMERCIAL STOCKS, CANADA:
12:      CIWH3C = BCIWH3C+JS3*(QWH1C+QWH2C+IWH3C(-4)-DDWH3C-DFWH1C-DFWH2C-DSCWH3C-EXWH3C-FIWH1C-FIWH2C)

   WHEAT CLOSING STOCKS, CANADA:
13:      IWH3C = BIWH3C+FIWH1C+FIWH2C+CIWH3C

   WHEAT EXPORT PRICE, CANADA (1967Q3-1983Q2):
14:      EXPWH1C = BEXPWH1C+JS3*(EXPWHC.0+EXPWHC.1*EXPWH4C*ER34C+EXPWHC.2*EXWH3C+EXPWHC.3*(QWH1C+IWH3C(-4)))

   WHEAT EXPORT PRICE, CANADA (1969Q3-1983Q2):
15:      EXPWH1 = BEXPWH1+(EXPWH1.1*JS3+EXPWH1.2*JS4+EXPWH1.3*JS1+EXPWH1.4*JS2)*(SUM(I = -3 TO 0 : EXPWH1C(I))*(1+(
         EXPWH4-SUM(I = -3 TO 0 : EXPWH4C(I)))/SUM(I = -3 TO 0 : EXPWH4C(I))))+EXPWH1.5*FIWH1(-1)+EXPWH1.6*ER34

   WHEAT EXPORT PRICE, CANADA (1969Q3-1983Q2):
16:      EXPWH3 = BEXPWH3+EXPWH3.1*EXPWH3(-1)+EXPWH3.2*FIWH1(-1)+EXPWH3.5*JS1*EXPWH1+EXPWH3.6*JS2*EXPWH1+EXPWH3.7*
         JS3*EXPWH1+EXPWH3.8*JS4*EXPWH1

   WHEAT DOMESTIC MILL PRICE, CANADA:
17:      XPWH3C = BXPWH3C+JS3*(IF YEARQ LT 19733 THEN 72.011 ELSE (IF YEARQ LT 19783 THEN 119.406 ELSE (IF YEARQ
          EQ 19793 THEN 183.72 ELSE (IF YEARQ LT 19843 THEN EXPWH1C ELSE (IF EXPWH1C+CROW GT 257.21 THEN 257.21
          ELSE (IF EXPWH1C+CROW LT 183.72 THEN 183.72 ELSE EXPWH1C+CROW))))))

   WHEAT DOMESTIC MILL PRICE, CANADA:
18:      XPWH3 = BXPWH3+(IF YEARQ LT 19733 THEN 72.011 ELSE (IF YEARQ LT 19784 THEN 119.41 ELSE (IF YEARQ GE 19793
          AND YEARQ LT 19803 THEN 183.72 ELSE (IF YEARQ LT 19844 THEN EXPWH1 ELSE (IF EXPWH3 GT 257.21 THEN 257.21
          ELSE (IF EXPWH3 LT 183.72 THEN 183.72 ELSE EXPWH3))))))

   WHEAT INITIAL PRICE, THUNDER BAY (1967Q3-1983Q2):
19:      XIPWH1C = BXIPWH1C+JS3*(XIPWHC.0+XIPWHC.4*EXPWH4C*ER34C+XIPWHC.2*IWH3C(-4)/SUM(I = -4 TO -1 : EXWH3C(I)+
         DDWH3C(I)+DFWH1C(I)+DFWH2C(I)+DSCWH3C(I))+XIPWHC.3*XIPWH1C(-4))

   WHEAT ADJUSTMENT PAYMENTS, THUNDER BAY (1967Q3-1983Q2):
20:      XAPWH1C = BXAPWH1C+JS3*(IF XIPWH1C GE 0.7*EXPWH1C THEN 0 ELSE XAPWHC.0+XAPWHC.2*(XPWH1C(-3)-XIPWH1C)+
         XAPWHC.1*(EXPWH1C-XIPWH1C))

   WHEAT INITIAL PRICE + ADJUSTMENTS, THUNDER BAY (1967Q3-1983Q2):
21:      XIPWH1 = BXIPWH1+JS3*(XIPWH1(-1)+2*XIPWH1C)/3+JS4*(XIPWH1C(-1)+XIPWH1.0*XAPWH1C(-1))+JS1*(XIPWH1C(-2)+
         XIPWH1.1*XAPWH1C(-2))+JS2*(XIPWH1C(-3)+XAPWH1C(-3))

   WHEAT FINAL PRICE, THUNDER BAY (1967Q3-1983Q2):
22:      XPWH1C = BXPWH1C+JS4*(XPWH1C.1*(0.5*EXPWH3+EXPWH3(-1)+EXPWH3(-2)+EXPWH3(-3)+0.5*EXPWH3(-4)))
```

```
   WHEAT OFF-BOARD PRICE, WESTERN CANADA (1967Q3-1983Q2):
23:       OPWH1C = BOPWH1C+JS3*(OPWH1C.0+OPWH1C.2*XIPWH1C+OPWH1C.3*XAPWH1C+OPWH1C.5*FIWH1C+OPWH1C.6*OPBA1C)

   WHEAT OFF-BOARD PRICE, WESTERN CANADA (1969Q3-1983Q2):
24:       OPWH1 = BOPWH1+(OPWH1.1*JS3+OPWH1.2*JS4+OPWH1.3*JS1+OPWH1.4*JS2)*(SUM(I = -3 TO 0 : OPWH1C(I))*(1+(OPBA1-
          SUM(I = -3 TO 0 : OPBA1C(I)))/SUM(I = -3 TO 0 : OPBA1C(I))))+OPWH1.5*FIWH1(-1)+OPWH1.6*EXPWH3
```

```
4:  FMWH1C = BFMWH1C+JS3*(FMWH1C.0+FMWH1C.1*(DDWH3C+EXWH3C-CIWH3C(-4))+FMWH1C.2*EXPWH1C+FMWH1C.3*(QWH1C+FIWH1C(-4))+
FMWH1C.4*CIWH3C/SUM(I = -3 TO 0 : EXWH3C(I)+DDWH3C(I)))
```

```
NOB = 64      NOVAR = 5
RANGE =  1967 3 TO 1983 2
RSQ =    0.99903      CRSQ =    0.99896      F(4/59) =  1.51E+04
SER =    0.2271       SSR =     3.044        DW(0) =  2.00      COND(X) =     24.72
LHS MEAN =       3.87811      SR =       0.00011
```

COEF	VALUE	ST ER	T-STAT	MEAN
FMWH1C.0	1.03295	0.51241	2.01587	0.25000
FMWH1C.1	1.05530	0.03210	32.87980	1.81743
FMWH1C.2	-0.00161	0.00150	-1.07162	36.26040
FMWH1C.3	0.10644	0.02106	5.05541	5.83118
FMWH1C.4	7.93626	0.44867	17.68850	0.14361

```
5:  FMWH1 = BFMWH1+JS3*(0.965*(FIWH1(-1)-FIWH1C(-4))+(FMWH1.1+FMWH1.2*CIWH3C(-4)+FMWH1.3*EXWH3C+FMWH1.4*(0.965*(FIWH1(-1
)-FIWH1C(-4)))+FMWH1.5*(XIPWH1C-XIPWH1(-1))+FMWH1.6*(QWH1C+FIWH1C(-4))+FMWH1.7*DLIFT))+JS4*(FMWH1.8+FMWH1.9*CIWH3C(-5)+
FMWH1.10*FMWH1C(-1)+FMWH1.11*(XIPWH1-XIPWH1C(-1)))+JS1*(FMWH1.13*(FMWH1C(-2)-FMWH1(-1)-FMWH1(-2)+0.965*(FIWH1(-3)-FIWH1C
(-6)))+FMWH1.15*(XIPWH1-XIPWH1(-1)))+JS2*(FMWH1.17*(FMWH1C(-3)-FMWH1(-1)-FMWH1(-2)-FMWH1(-3)+0.965*(FIWH1(-4)-FIWH1C(-7)
))+FMWH1.19*(XIPWH1-XIPWH1(-1)))
```

```
NOB = 56      NOVAR = 15
RANGE =  1969 3 TO 1983 2
RSQ =    0.90822      CRSQ =    0.87688      F(14/41) =     28.980
SER =    0.5247       SSR =     11.288       DW(0) =  1.93      COND(X) =     35.40
LHS MEAN =       4.03043      SR =       -0.28549
```

COEF	VALUE	ST ER	T-STAT	MEAN
FMWH1.1	1.58460	1.70603	0.92883	0.25000
FMWH1.2	-0.30698	0.12884	-2.38270	1.93993
FMWH1.3	0.13331	0.08678	1.53620	3.55726
FMWH1.4	-0.24010	0.28314	-0.84798	0.66171
FMWH1.5	0.00564	0.00847	0.66682	-2.68946
FMWH1.6	0.09341	0.06371	1.46627	5.86353
FMWH1.7	0.51019	0.81937	0.62266	0.01786
FMWH1.8	2.25124	1.54660	1.45561	0.25000

FMWH1.9	-0.18550	0.09520	-1.94848	1.93993
FMWH1.10	0.19922	0.05416	3.67825	4.00485
FMWH1.11	0.01191	0.01178	1.01082	1.76298
FMWH1.13	0.26178	0.01722	15.19790	2.32411
FMWH1.15	0.00817	0.01283	0.63664	1.74113
FMWH1.17	0.61914	0.02187	28.30400	1.69991
FMWH1.19	0.01513	0.01348	1.12247	1.18607

7: DDWH3C = BDDWH3C+JS3*(DDWH3C.0+DDWH3C.1*XPWH3C+DDWH3C.2*POPN3)

NOB = 64 NOVAR = 3
RANGE = 1967 3 TO 1983 2
RSQ = 0.99941 CRSQ = 0.99939 F(2/61) = 5.13E+04
SER = 0.0200 SSR = 2.434E-02 DW(0) = 1.99 COND(X) = 96.79
LHS MEAN = 0.46131 SR = 0.00002

COEF	VALUE	ST ER	T-STAT	MEAN
DDWH3C.0	0.03971	0.18676	0.21261	0.25000
DDWH3C.1	-5.38230E-04	2.18559E-04	-2.46263	31.89900
DDWH3C.2	0.08311	0.00939	8.85081	5.63764

8: DFWH1C = BDFWH1C+JS3*(DFWH1C.0+DFWH1C.1*OPWH1C+DFWH1C.2*DU74+DFWH1C.6*PHG1/OPBA1+DFWH1C.3*IHG1+DFWH1C.4*OPBA1C+DFWH1C.5*(QWH1C+FIWH1C(-4)))

NOB = 64 NOVAR = 7
RANGE = 1967 3 TO 1983 2
RSQ = 0.9929 CRSQ = 0.99216 F(6/57) = 1329.180
SER = 0.0490 SSR = 0.137 DW(0) = 1.97 COND(X) = 69.93
LHS MEAN = 0.31331 SR = 0.

COEF	VALUE	ST ER	T-STAT	MEAN
DFWH1C.0	0.20836	0.15960	1.30546	0.25000
DFWH1C.1	-0.00987	0.00239	-4.13171	22.30550
DFWH1C.2	-0.27127	0.06639	-4.08575	0.01563
DFWH1C.6	0.33224	0.08578	3.87302	0.19869
DFWH1C.3	1.28548E-04	2.47031E-05	5.20371	709.27000
DFWH1C.4	0.01276	0.00321	3.97925	17.93810
DFWH1C.5	0.01709	0.00511	3.34675	5.83118

9: DFWH2C = BDFWH2C+JS3*(DFWH2C.0+DFWH2C.1*(OPWH1C+CROW)+DFWH2C.2*FPC02C+DFWH2C.3*TIME)

NOB = 60 NOVAR = 4
RANGE = 1968 3 TO 1983 2
RSQ = 0.96348 CRSQ = 0.96152 F(3/56) = 492.468
SER = 0.0702 SSR = 0.276 DW(0) = 1.88 COND(X) = 23.20
LHS MEAN = 0.19887 SR = -0.

COEF	VALUE	ST ER	T-STAT	MEAN
DFWH2C.0	0.29879	0.08908	3.35408	0.25000
DFWH2C.1	-0.00483	0.00132	-3.65084	24.19050
DFWH2C.2	0.00421	0.00174	2.41567	23.24210
DFWH2C.3	0.00807	0.00195	4.14026	17.75000

11: FIWH1 = BFIWH1+(IF JS3 EQ 1 THEN QWH1C+FIWH1(-1)-FMWH1+FIWH1.0*DFWH1C ELSE FIWH1(-1)-FMWH1+FIWH1.1*JS4*DFWH1C(-1)+FIWH1.2*JS1*DFWH1C(-2)+FIWH1.3*JS2*DFWH1C(-3)-JS2*DSWH1C(-3))

NOB = 56 NOVAR = 4
RANGE = 1969 3 TO 1983 2
RSQ = 0.99986 CRSQ = 0.99986 F(3/52) = 1.27E+05
SER = 0.0716 SSR = 0.266 DW(0) = 1.61 COND(X) = 1.00
LHS MEAN = 14.62390 SR = -0.09868

COEF	VALUE	ST ER	T-STAT	MEAN
FIWH1.0	-0.17173	0.01497	-11.46790	0.31643
FIWH1.1	-0.25963	0.01497	-17.33800	0.31643
FIWH1.2	-0.25823	0.01497	-17.24460	0.31643
FIWH1.3	-0.17053	0.01497	-11.38800	0.31643

14: EXPWH1C = BEXPWH1C+JS3*(EXPWHC.0+EXPWHC.1*EXPWH4C*ER34C+EXPWHC.2*EXWH3C+EXPWHC.3*(QWH1C+IWH3C(-4)))

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.99835 CRSQ = 0.99826 F(3/60) = 1.21E+04
SER = 2.9529 SSR = 523.161 DW(0) = 1.89 COND(X) = 25.58
LHS MEAN = 36.26040 SR = 0.00023

COEF	VALUE	ST ER	T-STAT	MEAN
EXPWHC.0	37.04030	6.94883	5.33043	0.25000
EXPWHC.1	1.13759	0.02136	53.25910	32.77910
EXPWHC.2	-1.21805	0.31185	-3.90590	3.39429
EXPWHC.3	-0.77971	0.20632	-3.77919	7.89319

15: EXPWH1 = BEXPWH1+(EXPWH1.1*JS3+EXPWH1.2*JS4+EXPWH1.3*JS1+EXPWH1.4*JS2)*(SUM(I = -3 TO 0 : EXPWH1C(I))*(1+(EXPWH4-SUM(I = -3 TO 0 : EXPWH4C(I)))/SUM(I = -3 TO 0 : EXPWH4C(I))))+EXPWH1.5*FIWH1(-1)+EXPWH1.6*ER34

NOB = 56 NOVAR = 6
RANGE = 1969 3 TO 1983 2
RSQ = 0.981 CRSQ = 0.9791 F(5/50) = 516.342
SER = 9.0034 SSR = 4053.070 DW(0) = 1.42 COND(X) = 20.09
LHS MEAN = 154.73600 SR = -7.1685

COEF	VALUE	ST ER	T-STAT	MEAN
EXPWH1.1	0.92313	0.04879	18.91870	38.09590
EXPWH1.2	0.97466	0.02545	38.29820	40.11030
EXPWH1.3	0.94155	0.03131	30.07530	40.12870
EXPWH1.4	0.95383	0.03926	24.29660	37.88540
EXPWH1.5	-0.58637	0.46791	-1.25316	14.75190
EXPWH1.6	14.16340	10.48130	1.35131	1.08262

16: EXPWH3 = BEXPWH3+EXPWH3.1*EXPWH3(-1)+EXPWH3.2*FIWH1(-1)+EXPWH3.5*JS1*EXPWH1+EXPWH3.6*JS2*EXPWH1+EXPWH3.7*JS3*EXPWH1+EXPWH3.8*JS4*EXPWH1

NOB = 56 NOVAR = 6
RANGE = 1969 3 TO 1983 2
RSQ = 0.98748 CRSQ = 0.98623 F(5/50) = 788.694
SER = 7.5597 SSR = 2857.440 DW(0) = 1.56 COND(X) = 13.92
LHS MEAN = 151.06100 SR = -7.68784

COEF	VALUE	ST ER	T-STAT	MEAN
EXPWH3.1	0.62071	0.03706	16.74710	148.57900
EXPWH3.2	-0.16006	0.12521	-1.27839	14.75190
EXPWH3.5	0.40405	0.03875	10.42660	39.29380
EXPWH3.6	0.39562	0.04062	9.73981	38.07080
EXPWH3.7	0.36710	0.03754	9.77820	37.58380
EXPWH3.8	0.41719	0.03672	11.36090	39.78780

19: XIPWH1C = BXIPWH1C+JS3*(XIPWHC.0+XIPWHC.4*EXPWH4C*ER34C+XIPWHC.2*IWH3C(-4)/SUM(I = -4 TO -1 : EXWH3C(I)+ODWH3C(I)+DFWH1C(I)+DFWH2C(I)+DSCWH3C(I))+XIPWHC.3*XIPWH1C(-4))

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.99112 CRSQ = 0.99067 F(3/60) = 2231.160
SER = 4.5634 SSR = 1249.490 DW(0) = 1.98 COND(X) = 15.12
LHS MEAN = 24.29570 SR = 0.00043

COEF	VALUE	ST ER	T-STAT	MEAN

XIPWHC.0	5.16484	7.09722	0.72773	0.25000
XIPWHC.4	0.17271	0.04200	4.11166	32.77910
XIPWHC.2	-5.28539	3.79672	-1.39209	0.21235
XIPWHC.3	0.82324	0.04894	16.82010	22.43040

20: XAPWH1C = BXAPWH1C+JS3*(IF XIPWH1C GE 0.7*EXPWH1C THEN 0 ELSE XAPWHC.0+XAPWHC.2*(XPWH1C(-3)-XIPWH1C)+XAPWHC.1*(EXPWH1C-XIPWH1C))

NOB = 64 NOVAR = 3
RANGE = 1967 3 TO 1983 2
RSQ = 0.99077 CRSQ = 0.99047 F(2/61) = 3274.120
SER = 1.2832 SSR = 100.440 DW(0) = 2.00 COND(X) = 7.88
LHS MEAN = 4.10391 SR = -0.00005

COEF	VALUE	ST ER	T-STAT	MEAN
XAPWHC.0	-26.13850	1.90118	-13.74850	0.10938
XAPWHC.2	0.20915	0.01520	13.76140	1.07355
XAPWHC.1	0.71079	0.02080	34.17930	9.47993

21: XIPWH1 = BXIPWH1+JS3*(XIPWH1(-1)+2*XIPWH1C)/3+JS4*(XIPWH1C(-1)+XIPWH1.0*XAPWH1C(-1))+JS1*(XIPWH1C(-2)+XIPWH1.1*XAPWH1C(-2))+JS2*(XIPWH1C(-3)+XAPWH1C(-3))

NOB = 64 NOVAR = 2
RANGE = 1967 3 TO 1983 2
RSQ = 0.97882 CRSQ = 0.97848 F(1/62) = 2865.540
SER = 6.6074 SSR = 2706.740 DW(0) = 1.20 COND(X) = 1.00
LHS MEAN = 106.64100 SR = -4.1279

COEF	VALUE	ST ER	T-STAT	MEAN
XIPWH1.0	0.37828	0.06042	6.26121	4.10391
XIPWH1.1	0.76032	0.06042	12.58470	4.10391

22: XPWH1C = BXPWH1C+JS4*(XPWH1C.1*(0.5*EXPWH3+EXPWH3(-1)+EXPWH3(-2)+EXPWH3(-3)+0.5*EXPWH3(-4)))

NOB = 64 NOVAR = 1
RANGE = 1967 3 TO 1983 2
RSQ = 0.99923 CRSQ = 0.99923 F(0/63) = 8.14E+04
SER = 1.6783 SSR = 177.444 DW(0) = 2.00 COND(X) = 1.00
LHS MEAN = 30.59480 SR = 7.85689

COEF	VALUE	ST ER	T-STAT	MEAN
XPWH1C.1	0.22370	6.98076E-04	320.45200	136.21800

23: OPWH1C = BOPWH1C+JS3*(OPWH1C.0+OPWH1C.2*XIPWH1C+OPWH1C.3*XAPWH1C+OPWH1C.5*FIWH1C+OPWH1C.6*OPBA1C)

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.99784 CRSQ = 0.99769 F(4/59) = 6803.000
SER = 2.1180 SSR = 264.676 DW(0) = 1.98 COND(X) = 24.28
LHS MEAN = 22.30550 SR = 0.00008

COEF	VALUE	ST ER	T-STAT	MEAN
OPWH1C.0	0.36431	3.16323	0.11517	0.25000
OPWH1C.2	0.35831	0.03702	9.67972	24.29570
OPWH1C.3	0.27030	0.05981	4.51938	4.10391
OPWH1C.5	-0.53465	0.23681	-2.25775	1.41296
OPWH1C.6	0.73337	0.06562	11.17560	17.93810

24: OPWH1 = BOPWH1+(OPWH1.1*JS3+OPWH1.2*JS4+OPWH1.3*JS1+OPWH1.4*JS2)*(SUM(I = -3 TO 0 : OPWH1C(I))*(1+(OPBA1-SUM(I = -3 TO 0 : OPBA1C(I)))/SUM(I = -3 TO 0 : OPBA1C(I))))+OPWH1.5*FIWH1(-1)+OPWH1.6*EXPWH3

NOB = 56 NOVAR = 6
RANGE = 1969 3 TO 1983 2
RSQ = 0.99085 CRSQ = 0.98993 F(5/50) = 1082.340
SER = 4.1369 SSR = 855.687 DW(0) = 1.37 COND(X) = 22.80
LHS MEAN = 95.22340 SR = 6.03047

COEF	VALUE	ST ER	T-STAT	MEAN
OPWH1.1	0.88922	0.05033	17.66910	23.53180
OPWH1.2	0.87325	0.05291	16.50560	23.18970
OPWH1.3	0.87356	0.05255	16.62360	24.01770
OPWH1.4	0.89102	0.05181	17.19670	24.48420
OPWH1.5	-0.04386	0.06821	-0.64306	14.75190
OPWH1.6	0.07805	0.03347	2.33194	151.06100

APPENDIX C

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MODEL: DURUM


SYMBOL DECLARATIONS


ENDOGENOUS:
   FIWD1C   - DURUM CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
   FMWD1    - DURUM QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
   FMWD1C   - DURUM CROP YEAR FARM MARKETINGS, WESTERN CANADA (MIL T)
   QWD1C    - DURUM PRODUCTION, WESTERN CANADA (MIL T)
   XAPWD1C  - DURUM CWB ADJUSTMENT PAYMENTS, NO 1 CWAD, THUNDER BAY ($/T)
   XIPWD1   - DURUM CWB INITIAL PRICE + ADJUSTMENTS, NO 1 CWAD, THUNDER BAY ($/T)
   XIPWD1C  - DURUM CWB INITIAL PRICE, NO 1 CWAD, THUNDER BAY ($/T)
   XPWD1C   - DURUM CWB FINAL PRICE, NO 1 CWAD, THUNDER BAY ($/T)

EXOGENOUS:
   AWD1C    - DURUM ACREAGE, WESTERN CANADA (00,000 ACRES)
   DSCWD1C  - DURUM CROP YEAR SEED, FEED, WASTE AND DOCKAGE DISAPPEARANCE, WESTERN CANADA (MIL T)
   EXPWD1   - DURUM QUARTERLY CWB ASKING PRICE, NO 1 CWAD, THUNDER BAY ($/T)
   EXPWD1C  - DURUM CROP YEAR CWB ASKING PRICE, NO 1 CWAD, THUNDER BAY ($/T)
   EXPWH1C  - WHEAT CWB ASKING PRICE, NO 1 CWRS 13.5%, THUNDER BAY ($/T)
   EXWD3C   - DURUM EXPORTS, CANADA (MIL T)
   JS1      - SEASONAL DUMMY VARIABLE FOR FIRST QUARTER
   JS2      - SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
   JS3      - SEASONAL DUMMY VARIABLE FOR THIRD QUARTER
   JS4      - SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
   XIPWH1C  - WHEAT CWB INITIAL PRICE, NO 1 CWRS, THUNDER BAY ($/T)
   YEARQ    - QUARTERLY TREND VARIABLE
   YWD1C    - DURUM YIELD, WESTERN CANADA (KG/ACRE)

POLICY:
   BFIWD1C  BFMWD1  BFMWD1C  BQWD1C  BXAPWD1C  BXIPWD1  BXIPWD1C  BXPWD1C

COEFFICIENT:
   FMWD1.0  FMWD1.1  FMWD1.10  FMWD1.12  FMWD1.13  FMWD1.3  FMWD1.4  FMWD1.6  FMWD1.7  FMWD1.9  FMWD1C.0  FMWD1C.1
   FMWD1C.2  FMWD1C.3  XAPWD1.0  XAPWD1.1  XAPWD1.2  XAPWD1.3  XIPWDC.0  XIPWDC.1  XIPWDC.2  XIPWD1.0  XIPWD1.1
   XPWD1C.0  XPWD1C.1  XPWD1C.2


EQUATIONS


      DURUM PRODUCTION, WEST:
   1:       QWD1C = BQWD1C+AWD1C*YWD1C/10000

      DURUM FARM MARKETINGS, WEST (1967Q3-1983Q2):
   2:       FMWD1C = BFMWD1C+JS3*(FMWD1C.0+FMWD1C.1*EXWD3C+FMWD1C.2*EXPWD1C+FMWD1C.3*(QWD1C+FIWD1C(-4)))

      DURUM FARM MARKETINGS, WEST (1968Q3-1983Q2):
   3:       FMWD1 = BFMWD1+JS3*(-0.03838+0.53379*(FMWD1C(-4)-FMWD1(-1)-FMWD1(-2)-FMWD1(-3))-0.000455*(XIPWD1C-XIPWD1(
            -1))+FMWD1.0*(EXPWD1-EXPWD1(-1))+FMWD1.1*(QWD1C+FIWD1C(-4))+FMWD1.3*EXWD3C+FMWD1.4*(-0.03838+0.53379*(
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FMWD1C(-4)-FMWD1(-1)-FMWD1(-2)-FMWD1(-3))-0.000455*(XIPWD1C-XIPWD1(-1))))+JS4*(FMWD1.6*FMWD1C(-1)+FMWD1.7*
(EXPWD1-EXPWD1(-1)))+JS1*(FMWD1.9*(FMWD1C(-2)-FMWD1(-1))+FMWD1.10*(EXPWD1-EXPWD1(-1)))+JS2*(FMWD1.12*(
FMWD1C(-3)-FMWD1(-1)-FMWD1(-2))+FMWD1.13*(EXPWD1-EXPWD1(-1)))

  DURUM CLOSING FARM STOCKS, WEST:
4:      FIWD1C = BFIWD1C+JS3*(QWD1C+FIWD1C(-4)-FMWD1C-DSCWD1C)

  DURUM INITIAL PRICE, THUNDER BAY (1967Q3-1983Q2):
5:      XIPWD1C = BXIPWD1C+(IF YEARQ LE 19773 THEN JS3*XIPWH1C ELSE JS3*(XIPWDC.0+XIPWDC.1*EXPWD1C(-4)+XIPWDC.2*
        XIPWH1C))

  DURUM ADJUSTMENT PAYMENTS, THUNDER BAY (1967Q3-1983Q2):
6:      XAPWD1C = BXAPWD1C+JS3*(IF YEARQ LE 19773 THEN (IF XIPWD1C GE 0.7*EXPWH1C THEN 0 ELSE XAPWD1.0+XAPWD1.1*(
        EXPWH1C-XIPWD1C)) ELSE (IF XIPWD1C GE 0.7*EXPWD1C THEN 0 ELSE XAPWD1.2+XAPWD1.3*(EXPWD1C-XIPWD1C)))

  DURUM INITIAL PRICE + ADJUSTMENTS, THUNDER BAY (1967Q3-1983Q2):
7:      XIPWD1 = BXIPWD1+JS3*(XIPWD1(-1)+2*XIPWD1C)/3+JS4*(XIPWD1C(-1)+XIPWD1.0*XAPWD1C(-1))+JS1*(XIPWD1C(-2)+
        XIPWD1.1*XAPWD1C(-2))+JS2*(XIPWD1C(-3)+XAPWD1C(-3))

  DURUM FINAL PRICE, THUNDER BAY (1967Q3-1983Q2):
8:      XPWD1C = BXPWD1C+JS4*(XPWD1C.0+XPWD1C.1*EXPWD1C(-5)+XPWD1C.2*FIWD1C(-5))
```

```
2:  FMWD1C = BFMWD1C+JS3*(FMWD1C.0+FMWD1C.1*EXWD3C+FMWD1C.2*EXPWD1C+FMWD1C.3*(QWD1C+FIWD1C(-4)))

NOB = 64      NOVAR = 4
RANGE =  1967 3 TO 1983 2
RSQ =   0.97566      CRSQ =   0.97444      F(3/60) =   801.683
SER =   0.1325       SSR =     1.054       DW(0) =  2.00      COND(X) =    13.62
LHS MEAN =      0.43390      SR =      0.00003

COEF            VALUE           ST ER          T-STAT          MEAN

FMWD1C.0        0.03867         0.13027        0.29683         0.25000
FMWD1C.1        0.79223         0.08748        9.05580         0.38539
FMWD1C.2   1.59971E-04     4.93631E-04        0.32407        41.24890
FMWD1C.3        0.17113         0.06362        2.68973         0.65634
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```
3:  FMWD1 = BFMWD1+JS3*(-0.03838+0.53379*(FMWD1C(-4)-FMWD1(-1)-FMWD1(-2)-FMWD1(-3))-0.000455*(XIPWD1C-XIPWD1(-1))+
FMWD1.0*(EXPWD1-EXPWD1(-1))+FMWD1.1*(QWD1C+FIWD1C(-4))+FMWD1.3*EXWD3C+FMWD1.4*(-0.03838+0.53379*(FMWD1C(-4)-FMWD1(-1)-
FMWD1(-2)-FMWD1(-3))-0.000455*(XIPWD1C-XIPWD1(-1))))+JS4*(FMWD1.6*FMWD1C(-1)+FMWD1.7*(EXPWD1-EXPWD1(-1)))+JS1*(FMWD1.9*(
FMWD1C(-2)-FMWD1(-1))+FMWD1.10*(EXPWD1-EXPWD1(-1)))+JS2*(FMWD1.12*(FMWD1C(-3)-FMWD1(-1)-FMWD1(-2))+FMWD1.13*(EXPWD1-
EXPWD1(-1)))

NOB = 60      NOVAR = 10
RANGE =  1968 3 TO 1983 2
RSQ =   0.75089      CRSQ =   0.70605      F(9/50) =    16.746
```

SER = 0.1170 SSR = 0.685 DW(0) = 2.04 COND(X) = 9.63
LHS MEAN = 0.45021 SR = 0.07095

COEF	VALUE	ST ER	T-STAT	MEAN
FMWD1.0	0.00106	6.40362E-04	1.64838	3.40920
FMWD1.1	0.03617	0.04002	0.90387	0.68844
FMWD1.3	0.19669	0.07820	2.51528	0.40491
FMWD1.4	-0.54046	0.25702	-2.10283	0.06429
FMWD1.6	0.24120	0.01592	15.14890	0.45469
FMWD1.7	7.12584E-04	0.00143	0.49841	1.33067
FMWD1.9	0.23871	0.02472	9.65535	0.34340
FMWD1.10	0.00431	0.00218	1.98180	-2.01123
FMWD1.12	0.47955	0.02658	18.04270	0.26969
FMWD1.13	0.00494	0.00220	2.24568	-0.38662

5: XIPWD1C = BXIPWD1C+(IF YEARQ LE 19773 THEN JS3*XIPWH1C ELSE JS3*(XIPWDC.0+XIPWDC.1*EXPWD1C(-4)+XIPWDC.2*XIPWH1C))

NOB = 64 NOVAR = 3
RANGE = 1967 3 TO 1983 2
RSQ = 0.99733 CRSQ = 0.99725 F(2/61) = 1.14E+04
SER = 2.5487 SSR = 396.263 DW(0) = 2.00 COND(X) = 22.67
LHS MEAN = 24.72620 SR = -0.0036

COEF	VALUE	ST ER	T-STAT	MEAN
XIPWDC.0	-1.31034	6.74285	-0.19433	0.07813
XIPWDC.1	0.23615	0.04269	5.53192	17.05310
XIPWDC.2	0.69943	0.07927	8.82364	11.62490

6: XAPWD1C = BXAPWD1C+JS3*(IF YEARQ LE 19773 THEN (IF XIPWD1C GE 0.7*EXPWH1C THEN 0 ELSE XAPWD1.0+XAPWD1.1*(EXPWH1C-XIPWD1C)) ELSE (IF XIPWD1C GE 0.7*EXPWD1C THEN 0 ELSE XAPWD1.2+XAPWD1.3*(EXPWD1C-XIPWD1C)))

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.95066 CRSQ = 0.94819 F(3/60) = 385.317
SER = 3.9779 SSR = 949.444 DW(0) = 2.00 COND(X) = 8.47
LHS MEAN = 5.34203 SR = 0.00003

COEF	VALUE	ST ER	T-STAT	MEAN
XAPWD1.0	-19.09070	6.40098	-2.98246	0.06250
XAPWD1.1	0.84948	0.06715	12.64990	5.66250
XAPWD1.2	9.69775	9.85812	0.98373	0.04688
XAPWD1.3	0.26898	0.09515	2.82702	4.72308

7: XIPWD1 = BXIPWD1+JS3*(XIPWD1(-1)+2*XIPWD1C)/3+JS4*(XIPWD1C(-1)+XIPWD1.0*XAPWD1C(-1))+JS1*(XIPWD1C(-2)+XIPWD1.1*XAPWD1C(-2))+JS2*(XIPWD1C(-3)+XAPWD1C(-3))

NOB = 64 NOVAR = 2
RANGE = 1967 3 TO 1983 2
RSQ = 0.96541 CRSQ = 0.96485 F(1/62) = 1730.410
SER = 9.5701 SSR = 5678.430 DW(0) = 1.30 COND(X) = 1.00
LHS MEAN = 111.78100 SR = 3.9532

COEF	VALUE	ST ER	T-STAT	MEAN
XIPWD1.0	0.41167	0.06593	6.24373	5.34203
XIPWD1.1	0.77007	0.06593	11.67940	5.34203

8: XPWD1C = BXPWD1C+JS4*(XPWD1C.0+XPWD1C.1*EXPWD1C(-5)+XPWD1C.2*FIWD1C(-5))

NOB = 64 NOVAR = 3
RANGE = 1967 3 TO 1983 2
RSQ = 0.99349 CRSQ = 0.99328 F(2/61) = 4655.970
SER = 5.6661 SSR = 1958.370 DW(0) = 2.00 COND(X) = 5.52
LHS MEAN = 34.58370 SR = 0.00006

COEF	VALUE	ST ER	T-STAT	MEAN
xPWD1C.0	14.06290	3.87609	3.62812	0.25000
XPWD1C.1	0.79939	0.01773	45.08330	39.38750
xPWD1C.2	-2.72623	2.84805	-0.95723	0.15324

APPENDIX D

MODEL: BARLEY

SYMBOL DECLARATIONS

ENDOGENOUS:

CIBA3C	- BARLEY CLOSING CROP YEAR COMMERCIAL INVENTORIES, CANADA (MIL T)
DFBA1C	- BARLEY CROP YEAR FEED, WASTE AND DOCKAGE DISAPPEARANCE, WESTERN CANADA (MIL T)
DFBA2C	- BARLEY CROP YEAR FEED, WASTE AND DOCKAGE DISAPPEARANCE, EASTERN CANADA (MIL T)
EXPBA3	- BARLEY QUARTERLY UNIT VALUE EXPORT PRICE, CANADA ($/T)
EXPBA3C	- BARLEY CROP YEAR UNIT VALUE EXPORT PRICE, CANADA ($/T)
FIBA1	- BARLEY CLOSING QUARTERLY FARM INVENTORIES, WESTERN CANADA (MIL T)
FIBA1C	- BARLEY CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FMBA1	- BARLEY QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMBA1C	- BARLEY CROP YEAR FARM MARKETINGS, WESTERN CANADA (MIL T)
IBA3C	- BARLEY CLOSING CROP YEAR INVENTORIES (MIL T)
OPBA1	- BARLEY QUARTERLY OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPBA1C	- BARLEY CROP YEAR OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPBA3	- BARLEY QUARTERLY OFF-BOARD PRICE, THUNDER BAY ($/T)
OPBA3C	- BARLEY CROP YEAR OFF-BOARD PRICE, THUNDER BAY ($/T)
QBA1C	- BARLEY PRODUCTION, WESTERN CANADA (MIL T)
QBA2C	- BARLEY PRODUCTION, EASTERN CANADA (MIL T)
XAPBA1C	- BARLEY CWB ADJUSTMENT PAYMENTS, NO 1 FEED, THUNDER BAY ($/T)
XIPBA1	- BARLEY CWB INITIAL PRICE + ADJUSTMENTS, NO 1 FEED, THUNDER BAY ($/T)
XIPBA1C	- BARLEY CWB INITIAL PRICE, NO 1 FEED, THUNDER BAY ($/T)
XPBA1C	- BARLEY CWB FINAL PRICE, NO 1 FEED, THUNDER BAY ($/T)

EXOGENOUS:

ABA1C	- BARLEY ACREAGE, WESTERN CANADA (00,000 ACRES)
ABA2C	- BARLEY ACREAGE, EASTERN CANADA (00,000 ACRES)
CROW	- TRANSPORTATION COST, SCOTT SASKATCHEWAN TO PORT ($/T)
DCWB	- DUMMY VARIABLE FOR CHANGE IN CANADIAN GRAIN MARKETING REGULATIONS
DDBA3C	- BARLEY CROP YEAR FOOD + INDUSTRIAL DISAPPEARANCE, CANADA (MIL T)
DSBA1C	- BARLEY CROP YEAR SEED DISAPPEARANCE, WESTERN CANADA (MIL T)
DSCBA3C	- BARLEY CROP YEAR SEED DISAPPEARANCE + LOSS IN HANDLING - IMPORTS, CANADA (MIL T)
D1981	- DUMMY VARIABLE FOR UNUSUAL PRICE PREMIUM ON BARLEY RELATIVE TO CORN
ER34	- QUARTERLY EXCHANGE RATE (CDN $/US $)
ER34C	- CROP YEAR EXCHANGE RATE (CDN $/US $)
EXBA3C	- BARLEY EXPORTS, CANADA (MIL T)
FIBA2C	- BARLEY CLOSING CROP YEAR FARM INVENTORIES, EASTERN CANADA (MIL T)
FPCO2	- CORN QUARTERLY ELEVATOR PRICE, CHATHAM ($/T)
FPCO2C	- CORN CROP YEAR ELEVATOR PRICE, CHATHAM ($/T)
IHF1S	- BEEF HEIFERS, SEMI-ANNUAL CLOSING NUMBER ON FARMS, WESTERN CANADA (000)
IHF2S	- BEEF HEIFERS, SEMI-ANNUAL CLOSING NUMBER ON FARMS, EASTERN CANADA (000)
IHG1	- PIGS, QUARTERLY CLOSING NUMBER ON FARMS, WESTERN CANADA (000)
IHG2	- PIGS, QUARTERLY CLOSING NUMBER ON FARMS, EASTERN CANADA (000)
ISS1S	- STEERS, SEMI-ANNUAL CLOSING NUMBER ON FARMS, WESTERN CANADA (000)
ISS2S	- STEERS, SEMI-ANNUAL CLOSING NUMBER ON FARMS, EASTERN CANADA (000)
JS1	- SEASONAL DUMMY VARIABLE FOR FIRST QUARTER
JS2	- SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
JS3	- SEASONAL DUMMY VARIABLE FOR THIRD QUARTER

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   JS4      - SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
   PCO4     - CORN QUARTERLY PRICE, CHICAGO (US $/T)
   PCO4C    - CORN CROP YEAR PRICE, CHICAGO (US $/T)
   PHG1     - HOGS QUARTERLY PRICE, INDEX 100, EDMONTON ($/CWT)
   PHG2     - HOGS QUARTERLY PRICE, INDEX 100, TORONTO ($/CWT)
   PSM4C    - SOYBEAN MEAL PRICE, 44% PROTEIN, DECATUR (US $/T)
   QCO3C    - CORN PRODUCTION, CANADA (MIL T)
   TIME     - TIME TREND
   YBA1C    - BARLEY YIELD, WESTERN CANADA (KG/ACRE)
   YBA2C    - BARLEY YIELD, EASTERN CANADA (KG/ACRE)

POLICY:
   BCIBA3C  BDFBA1C  BDFBA2C  BEXPBA3  BEXPBA3C  BFIBA1  BFIBA1C  BFMBA1  BFMBA1C  BIBA3C  BOPBA1  BOPBA1C  BOPBA3
   BOPBA3C  BQBA1C  BQBA2C  BXAPBA1C  BXIPBA1  BXIPBA1C  BXPBA1C

COEFFICIENT:
   DFBA1C.0  DFBA1C.1  DFBA1C.2  DFBA1C.3  DFBA1C.4  DFBA1C.5  DFBA2C.0  DFBA2C.1  DFBA2C.2  DFBA2C.3  DFBA2C.4
   DFBA2C.5  EXPBAC.0  EXPBAC.1  EXPBAC.2  EXPBAC.3  EXPBAC.4  EXPBAC.5  EXPBA3.1  EXPBA3.2  EXPBA3.3  EXPBA3.4
   EXPBA3.5  FIBA1.0  FIBA1.1  FIBA1.2  FIBA1.3  FMBA1.1  FMBA1.10  FMBA1.11  FMBA1.12  FMBA1.13  FMBA1.14  FMBA1.15
   FMBA1.16  FMBA1.17  FMBA1.2  FMBA1.4  FMBA1.5  FMBA1.6  FMBA1.7  FMBA1.8  FMBA1.9  FMBA1C.0  FMBA1C.1  FMBA1C.2
   FMBA1C.3  FMBA1C.4  OPBA1.1  OPBA1.10  OPBA1.2  OPBA1.3  OPBA1.4  OPBA1.5  OPBA1.6  OPBA1.7  OPBA1.8  OPBA1.9
   OPBA1C.0  OPBA1C.1  OPBA1C.2  OPBA1C.3  OPBA1C.4  OPBA3.1  OPBA3.2  OPBA3.3  OPBA3.4  OPBA3.6  OPBA3C.0  OPBA3C.1
   OPBA3C.2  OPBA3C.4  OPBA3C.5  XAPBAC.0  XAPBAC.1  XAPBAC.2  XIPBAC.0  XIPBAC.1  XIPBAC.2  XIPBAC.3  XIPBAC.4
   XIPBA1.0  XIPBA1.1  XPBA1C.1


EQUATIONS


     BARLEY PRODUCTION, WEST:
  1:       QBA1C = BQBA1C+ABA1C*YBA1C/10000

     BARLEY PRODUCTION, EAST:
  2:       QBA2C = BQBA2C+ABA2C*YBA2C/10000

     BARLEY FARM MARKETINGS, WEST (1967Q3-1983Q2):
  3:       FMBA1C = BFMBA1C+JS3*(FMBA1C.0+FMBA1C.1*(DDBA3C+EXBA3C-CIBA3C(-4))+FMBA1C.2*OPBA1C+FMBA1C.3*(QBA1C+FIBA1C(
           -4))+FMBA1C.4*QCO3C)

     BARLEY FARM MARKETINGS, WEST (1968Q3-1983Q2):
  4:       FMBA1 = BFMBA1+JS3*(-0.19362-0.00245*(XIPBA1C-XIPBA1(-1))+0.93818*(FIBA1(-1)-FIBA1C(-4))+FMBA1.1+FMBA1.2*
           CIBA3C(-4)+FMBA1.4*OPBA1+FMBA1.5*(QBA1C-FIBA1C(-4)))+JS4*(FMBA1.6+FMBA1.7*CIBA3C(-5)+FMBA1.8*(XIPBA1-
           XIPBA1C(-1))+FMBA1.9*FMBA1C(-1))+JS1*(FMBA1.10+FMBA1.11*(FMBA1C(-2)-FMBA1(-1)-FMBA1(-2)+(-0.19362-0.00245*
           (XIPBA1C(-2)-XIPBA1(-3))+0.93818*(FIBA1(-3)-FIBA1C(-6))))+FMBA1.12*IHG1+FMBA1.13*XIPBA1)+JS2*(FMBA1.14+
           FMBA1.15*(FMBA1C(-3)-FMBA1(-1)-FMBA1(-2)-FMBA1(-3)+(-0.19362-0.00245*(XIPBA1C(-3)-XIPBA1(-4))+0.93818*(
           FIBA1(-4)-FIBA1C(-7))))+FMBA1.16*FIBA1(-1)+FMBA1.17*IHG1)

     BARLEY FEED USE, WEST (1967Q3-1983Q2):
  5:       DFBA1C = BDFBA1C+JS3*(DFBA1C.0+DFBA1C.1*IHG1(-1)+DFBA1C.2*(ISS1S(-1)+IHF1S(-1))+DFBA1C.3*OPBA1C+DFBA1C.4*
           PHG1/PHG1(-4)+DFBA1C.5*(QBA1C+FIBA1C(-4)))

     BARLEY FEED USE (1967Q3-1983Q2):
  6:       DFBA2C = BDFBA2C+JS3*(DFBA2C.0+DFBA2C.1*IHG2(-1)+DFBA2C.2*(ISS2S(-1)+IHF2S(-1))+DFBA2C.3*OPBA3C+DFBA2C.4*
           FPCO2C+DFBA2C.5*PHG2/PHG2(-4))
```

```
   BARLEY CLOSING FARM STOCKS, WEST:
 7:        FIBA1C = BFIBA1C+JS3*(QBA1C+FIBA1C(-4)-FMBA1C-DFBA1C-DSBA1C)

   BARLEY CLOSING FARM STOCKS, WEST (1967Q3-1983Q2):
 8:        FIBA1 = BFIBA1+(IF JS3 EQ 1 THEN QBA1C+FIBA1(-1)-FMBA1+FIBA1.0*DFBA1C ELSE FIBA1(-1)-FMBA1+FIBA1.1*JS4*
           DFBA1C(-1)+FIBA1.2*JS1*DFBA1C(-2)+FIBA1.3*JS2*DFBA1C(-3)-JS2*DSBA1C(-3))

   BARLEY CLOSING COMMERCIAL STOCKS, CANADA:
 9:        CIBA3C = BCIBA3C+JS3*(QBA1C+QBA2C+IBA3C(-4)-DDBA3C-DFBA1C-DFBA2C-DSCBA3C-EXBA3C-FIBA1C-FIBA2C)

   BARLEY CLOSING STOCKS, CANADA:
10:        IBA3C = BIBA3C+FIBA1C+FIBA2C+CIBA3C

   BARLEY EXPORT PRICE, CANADA (1967Q3-1983Q2):
11:        EXPBA3C = BEXPBA3C+JS3*(EXPBAC.0+(EXPBAC.1+EXPBAC.2*DCWB)*FPCO2C+EXPBAC.3*D1981+EXPBAC.4*PSM4C/SUM(I = -3
            TO 0 : PCO4C(I))+EXPBAC.5*(QBA1C+IBA3C(-4)))

   BARLEY EXPORT PRICE, CANADA (1967Q3-1983Q2):
12:        EXPBA3 = BEXPBA3+(EXPBA3.1*JS4+EXPBA3.2*JS1+EXPBA3.3*JS2+EXPBA3.4*JS3)*(SUM(I = -4 TO -1 : EXPBA3C(I))*(1+
           (PCO4-SUM(I = -4 TO -1 : PCO4C(I)))/SUM(I = -4 TO -1 : PCO4C(I))))+EXPBA3.5*ER34

   BARLEY INITIAL PRICE, THUNDER BAY (1967Q3-1983Q2):
13:        XIPBA1C = BXIPBA1C+JS3*(XIPBAC.0+XIPBAC.4*PCO4C*ER34C+XIPBAC.1*EXPBA3C(-4)+XIPBAC.2*IBA3C(-4)/SUM(I = -4
            TO -1 : EXBA3C(I)+DDBA3C(I)+DFBA1C(I)+DFBA2C(I)+DSCBA3C(I))+XIPBAC.3*XIPBA1C(-4))

   BARLEY ADJUSTMENT PAYMENTS, THUNDER BAY (1967Q3-1983Q2):
14:        XAPBA1C = BXAPBA1C+JS3*(IF XIPBA1C GE 0.75*(0.5*EXPBA3C+0.5*PCO4C*ER34C) THEN 0 ELSE XAPBAC.0+XAPBAC.2*(
           EXPBA3C-PCO4C*ER34C)+XAPBAC.1*((0.5*EXPBA3C+0.5*PCO4C*ER34C)/SUM(I = -3 TO 0 : XIPBA1C(I))))

   BARLEY INITIAL PRICE + ADJUSTMENTS, THUNDER BAY (1967Q3-1983Q2):
15:        XIPBA1 = BXIPBA1+JS3*(XIPBA1(-1)+2*XIPBA1C)/3+JS4*(XIPBA1C(-1)+XIPBA1.0*XAPBA1C(-1))+JS1*(XIPBA1C(-2)+
           XIPBA1.1*XAPBA1C(-2))+JS2*(XIPBA1C(-3)+XAPBA1C(-3))

   BARLEY FINAL PRICE, THUNDER BAY (1967Q3-1983Q2):
16:        XPBA1C = BXPBA1C+JS4*(XPBA1C.1*(0.5*EXPBA3+EXPBA3(-1)+EXPBA3(-2)+EXPBA3(-3)+0.5*EXPBA3(-4)))

   BARLEY OFF-BOARD PRICE, THUNDER BAY (1967Q3-1983Q2):
17:        OPBA3C = BOPBA3C+JS3*(OPBA3C.0+OPBA3C.1*XIPBA1C+OPBA3C.2*XAPBA1C+OPBA3C.4*FIBA1C+OPBA3C.5*FPCO2C)

   BARLEY OFF-BOARD PRICE, THUNDER BAY (1967Q3-1983Q2):
18:        OPBA3 = BOPBA3+(OPBA3.1*JS3+OPBA3.2*JS4+OPBA3.3*JS1+OPBA3.4*JS2)*(SUM(I = -3 TO 0 : OPBA3C(I))*(1+(FPCO2-
           SUM(I = -3 TO 0 : FPCO2C(I)))/SUM(I = -3 TO 0 : FPCO2C(I))))+OPBA3.6*IHG1(-1)

   BARLEY OFF-BOARD PRICE, WESTERN CANADA (1967Q3-1983Q2):
19:        OPBA1C = BOPBA1C+JS3*(OPBA1C.0+OPBA1C.1*(OPBA3C-CROW)+OPBA1C.2*FIBA1C(-4)+OPBA1C.3*IHG1+OPBA1C.4*TIME)

   BARLEY OFF-BOARD PRICE, WESTERN CANADA (1967Q3-1983Q2):
20:        OPBA1 = BOPBA1+(OPBA1.7*JS3+OPBA1.8*JS4+OPBA1.9*JS1+OPBA1.10*JS2)*SUM(I = -3 TO 0 : OPBA1C(I))+(OPBA1.1*
           JS3+OPBA1.2*JS4+OPBA1.3*JS1+OPBA1.4*JS2)*(OPBA3-SUM(I = -3 TO 0 : OPBA3C(I)))+OPBA1.5*FIBA1(-1)+OPBA1.6*
           IHG1(-1)
```

3: FMBA1C = BFMBA1C+JS3*(FMBA1C.0+FMBA1C.1*(DDBA3C+EXBA3C-CIBA3C(-4))+FMBA1C.2*OPBA1C+FMBA1C.3*(QBA1C+FIBA1C(-4))+FMBA1C.4*QCO3C)

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.999 CRSQ = 0.99893 F(4/59) = 1.47E+04
SER = 0.0767 SSR = 0.347 DW(0) = 1.96 COND(X) = 29.92
LHS MEAN = 1.26896 SR = 0.00001

COEF	VALUE	ST ER	T-STAT	MEAN
FMBA1C.0	-0.72842	0.16635	-4.37897	0.25000
FMBA1C.1	0.73337	0.03354	21.86290	0.50613
FMBA1C.2	0.02094	9.32027E-04	22.46780	17.93810
FMBA1C.3	0.35248	0.01772	19.88740	2.83792
FMBA1C.4	-0.31668	0.02897	-10.93200	0.93489

4: FMBA1 = BFMBA1+JS3*(-0.19362-0.00245*(XIPBA1C-XIPBA1(-1))+0.93818*(FIBA1(-1)-FIBA1C(-4))+FMBA1.1+FMBA1.2*CIBA3C(-4)+FMBA1.4*OPBA1+FMBA1.5*(QBA1C-FIBA1C(-4)))+JS4*(FMBA1.6+FMBA1.7*CIBA3C(-5)+FMBA1.8*(XIPBA1-XIPBA1C(-1))+FMBA1.9*FMBA1C(-1))+JS1*(FMBA1.10+FMBA1.11*(FMBA1C(-2)-FMBA1(-1)-FMBA1(-2)+(-0.19362-0.00245*(XIPBA1C(-2)-XIPBA1(-3))+0.93818*(FIBA1(-3)-FIBA1C(-6))))+FMBA1.12*IHG1+FMBA1.13*XIPBA1)+JS2*(FMBA1.14+FMBA1.15*(FMBA1C(-3)-FMBA1(-1)-FMBA1(-2)-FMBA1(-3)+(-0.19362-0.00245*(XIPBA1C(-3)-XIPBA1(-4))+0.93818*(FIBA1(-4)-FIBA1C(-7))))+FMBA1.16*FIBA1(-1)+FMBA1.17*IHG1)

NOB = 60 NOVAR = 16
RANGE = 1968 3 TO 1983 2
RSQ = 0.80055 CRSQ = 0.73256 F(15/44) = 11.774
SER = 0.2636 SSR = 3.057 DW(0) = 1.67 COND(X) = 21.65
LHS MEAN = 1.35519 SR = 0.00004

COEF	VALUE	ST ER	T-STAT	MEAN
FMBA1.1	0.73596	0.32055	2.29596	0.25000
FMBA1.2	-0.20666	0.12904	-1.60154	0.48601
FMBA1.4	0.00413	0.00241	1.71252	18.23930
FMBA1.5	0.00380	0.03210	0.11837	2.04477
FMBA1.6	0.60599	0.36276	1.67051	0.25000
FMBA1.7	-0.32405	0.17273	-1.87608	0.48601
FMBA1.8	0.03759	0.02067	1.81889	0.62527
FMBA1.9	0.27756	0.05415	5.12591	1.32187
FMBA1.10	-0.62197	0.54310	-1.14523	0.25000
FMBA1.11	0.24883	0.10181	2.44414	0.77089
FMBA1.12	1.85952E-04	1.65842E-04	1.12126	713.12300
FMBA1.13	0.00353	0.00353	1.00042	19.21210
FMBA1.14	-0.93770	0.46319	-2.02443	0.25000
FMBA1.15	0.53122	0.14047	3.78172	0.53405
FMBA1.16	0.11262	0.08570	1.31421	1.43188
FMBA1.17	1.94005E-04	1.29539E-04	1.49766	707.31600

5: DFBA1C = BDFBA1C+JS3*(DFBA1C.0+DFBA1C.1*IHG1(-1)+DFBA1C.2*(ISS1S(-1)+IHF1S(-1))+DFBA1C.3*OPBA1C+DFBA1C.4*PHG1/PHG1(-4)+DFBA1C.5*(QBA1C+FIBA1C(-4)))

NOB = 64 NOVAR = 6
RANGE = 1967 3 TO 1983 2
RSQ = 0.99804 CRSQ = 0.99787 F(5/58) = 5899.830
SER = 0.0831 SSR = 0.400 DW(0) = 1.98 COND(X) = 34.63
LHS MEAN = 1.01589 SR = 0.00003

COEF	VALUE	ST ER	T-STAT	MEAN
DFBA1C.0	-1.45993	0.24119	-6.05311	0.25000
DFBA1C.1	7.31000E-04	4.48320E-05	16.30530	691.56200
DFBA1C.2	9.13603E-04	8.92533E-05	10.23610	529.61500
DFBA1C.3	-0.00691	7.73526E-04	-8.93326	17.93810
DFBA1C.4	0.54372	0.07311	7.43681	0.27653
DFBA1C.5	0.12865	0.01164	11.05310	2.83792

6: DFBA2C = BDFBA2C+JS3*(DFBA2C.0+DFBA2C.1*IHG2(-1)+DFBA2C.2*(ISS2S(-1)+IHF2S(-1))+DFBA2C.3*OPBA3C+DFBA2C.4*FPC02C+DFBA2C.5*PHG2/PHG2(-4))

NOB = 64 NOVAR = 6
RANGE = 1967 3 TO 1983 2
RSQ = 0.99241 CRSQ = 0.99176 F(5/58) = 1517.380
SER = 0.0662 SSR = 0.254 DW(0) = 2.00 COND(X) = 94.55
LHS MEAN = 0.40185 SR = -0.00001

COEF	VALUE	ST ER	T-STAT	MEAN
DFBA2C.0	-2.08722	0.47352	-4.40788	0.25000
DFBA2C.1	2.28801E-04	2.87540E-05	7.95722	1139.96000
DFBA2C.2	0.00202	3.52515E-04	5.72464	302.62100
DFBA2C.3	-0.01425	0.00193	-7.37551	21.97610
DFBA2C.4	0.01489	0.00202	7.36559	22.58650
DFBA2C.5	0.10635	0.07684	1.38405	0.27344

8: FIBA1 = BFIBA1+(IF JS3 EQ 1 THEN QBA1C+FIBA1(-1)-FMBA1+FIBA1.0*DFBA1C ELSE FIBA1(-1)-FMBA1+FIBA1.1*JS4*DFBA1C(-1)+FIBA1.2*JS1*DFBA1C(-2)+FIBA1.3*JS2*DFBA1C(-3)-JS2*DSBA1C(-3))

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.99973 CRSQ = 0.99972 F(3/60) = 7.37E+04
SER = 0.0511 SSR = 0.157 DW(0) = 1.08 COND(X) = 1.00
LHS MEAN = 6.57374 SR = 0.06557

COEF	VALUE	ST ER	T-STAT	MEAN
FIBA1.0	-0.19642	0.00311	-63.14590	1.01589
FIBA1.1	-0.26862	0.00311	-86.35850	1.01589
FIBA1.2	-0.26869	0.00311	-86.37920	1.01589
FIBA1.3	-0.21534	0.00311	-69.22720	1.01589

11: EXPBA3C = BEXPBA3C+JS3*(EXPBAC.0+(EXPBAC.1+EXPBAC.2*DCWB)*FPC02C+EXPBAC.3*D1981+EXPBAC.4*PSM4C/SUM(I = -3 TO 0 : PC04C(I))+EXPBAC.5*(QBA1C+IBA3C(-4)))

NOB = 64 NOVAR = 6
RANGE = 1967 3 TO 1983 2
RSQ = 0.99789 CRSQ = 0.99771 F(5/58) = 5490.380
SER = 2.4249 SSR = 341.043 DW(0) = 2.00 COND(X) = 31.55
LHS MEAN = 26.11870 SR = -0.00003

COEF	VALUE	ST ER	T-STAT	MEAN
EXPBAC.0	40.32470	5.28770	7.62613	0.25000
EXPBAC.1	0.36530	0.07243	5.04344	22.58650
EXPBAC.2	0.58904	0.04254	13.84740	17.39070
EXPBAC.3	36.50210	2.64439	13.80360	0.01563
EXPBAC.4	9.05979	1.49564	6.05745	0.47163
EXPBAC.5	-2.18533	0.33522	-6.51903	3.34062

12: EXPBA3 = BEXPBA3+(EXPBA3.1*JS4+EXPBA3.2*JS1+EXPBA3.3*JS2+EXPBA3.4*JS3)*(SUM(I = -4 TO -1 : EXPBA3C(I))*(1+(PC04-SUM(I = -4 TO -1 : PC04C(I)))/SUM(I = -4 TO -1 : PC04C(I))))+EXPBA3.5*ER34

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.95439 CRSQ = 0.9513 F(4/59) = 308.634
SER = 9.9172 SSR = 5802.720 DW(0) = 1.64 COND(X) = 5.22
LHS MEAN = 103.12500 SR = -4.54082

COEF	VALUE	ST ER	T-STAT	MEAN
EXPBA3.1	0.97756	0.03623	26.97860	24.77830
EXPBA3.2	0.95040	0.03549	26.77660	25.75760
EXPBA3.3	0.97498	0.03464	28.14370	26.75680
EXPBA3.4	0.93931	0.03567	26.33020	25.52380
EXPBA3.5	4.09567	3.09038	1.32530	1.08190

13: XIPBA1C = BXIPBA1C+JS3*(XIPBAC.0+XIPBAC.4*PC04C*ER34C+XIPBAC.1*EXPBA3C(-4)+XIPBAC.2*IBA3C(-4)/SUM(I = -4 TO -1 : EXBA3C(I)+DDBA3C(I)+DFBA1C(I)+DFBA2C(I)+DSCBA3C(I))+XIPBAC.3*XIPBA1C(-4))

```
NOB = 64      NOVAR = 5
RANGE =  1967 3 TO 1983 2
RSQ =   0.98937      CRSQ =   0.98865      F(4/59) =  1372.570
SER =   3.6157       SSR =   771.307       DW(0) =  1.94      COND(X) =    24.37
LHS MEAN =      17.56760      SR =      -0.00003

COEF            VALUE            ST ER          T-STAT          MEAN

XIPBAC.0      16.59390         5.23050         3.17253         0.25000
XIPBAC.4       0.29603         0.04801         6.16660        24.08400
XIPBAC.1       0.12814         0.07203         1.77900        24.94270
XIPBAC.2     -34.02940         7.58108        -4.48873         0.10355
XIPBAC.3       0.40169         0.09392         4.27717        16.47330
```

14: XAPBA1C = BXAPBA1C+JS3*(IF XIPBA1C GE 0.75*(0.5*EXPBA3C+0.5*PC04C*ER34C) THEN 0 ELSE XAPBAC.0+XAPBAC.2*(EXPBA3C-PC04C*ER34C)+XAPBAC.1*((0.5*EXPBA3C+0.5*PC04C*ER34C)/SUM(I = -3 TO 0 : XIPBA1C(I))))

```
NOB = 64      NOVAR = 3
RANGE =  1967 3 TO 1983 2
RSQ =   0.86299      CRSQ =   0.8585       F(2/61) =   192.113
SER =   2.1980       SSR =   294.704       DW(0) =  2.00      COND(X) =    20.22
LHS MEAN =       1.63062      SR =       0.00008

COEF            VALUE            ST ER          T-STAT          MEAN

XAPBAC.0     -56.57920         7.12604        -7.93979         0.12500
XAPBAC.2       0.46408         0.07131         6.50792         0.93101
XAPBAC.1      40.41890         4.33583         9.32205         0.20463
```

15: XIPBA1 = BXIPBA1+JS3*(XIPBA1(-1)+2*XIPBA1C)/3+JS4*(XIPBA1C(-1)+XIPBA1.0*XAPBA1C(-1))+JS1*(XIPBA1C(-2)+XIPBA1.1*XAPBA1C(-2))+JS2*(XIPBA1C(-3)+XAPBA1C(-3))

```
NOB = 64      NOVAR = 2
RANGE =  1967 3 TO 1983 2
RSQ =   0.99127      CRSQ =   0.99113      F(1/62) =  7036.570
SER =   2.8262       SSR =   495.207       DW(0) =  1.03      COND(X) =     1.00
LHS MEAN =      73.80600      SR =      13.4148

COEF            VALUE            ST ER          T-STAT          MEAN

XIPBA1.0       0.28870         0.05866         4.92160         1.63062
XIPBA1.1       0.64123         0.05866        10.93130         1.63062
```

16: XPBA1C = BXPBA1C+JS4*(XPBA1C.1*(0.5*EXPBA3+EXPBA3(-1)+EXPBA3(-2)+EXPBA3(-3)+0.5*EXPBA3(-4)))

NOB = 64 NOVAR = 1
RANGE = 1967 3 TO 1983 2
RSQ = 0.99581 CRSQ = 0.99581 F(0/63) = 1.50E+04
SER = 2.5877 SSR = 421.875 DW(0) = 2.00 COND(X) = 1.00
LHS MEAN = 20.60370 SR = 9.5022

COEF	VALUE	ST ER	T-STAT	MEAN
XPBA1C.1	0.20413	0.00148	137.98600	100.20900

17: OPBA3C = BOPBA3C+JS3*(OPBA3C.0+OPBA3C.1*XIPBA1C+OPBA3C.2*XAPBA1C+OPBA3C.4*FIBA1C+OPBA3C.5*FPC02C)

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.99837 CRSQ = 0.99826 F(4/59) = 9054.920
SER = 1.7283 SSR = 176.233 DW(0) = 1.98 COND(X) = 24.29
LHS MEAN = 21.97610 SR = -0.00006

COEF	VALUE	ST ER	T-STAT	MEAN
OPBA3C.0	27.90710	1.88495	14.80530	0.25000
OPBA3C.1	0.50966	0.04213	12.09710	17.56760
OPBA3C.2	0.66127	0.07482	8.83759	1.63062
OPBA3C.4	-9.09610	0.60362	-15.06920	0.45722
OPBA3C.5	0.40406	0.04311	9.37323	22.58650

18: OPBA3 = BOPBA3+(OPBA3.1*JS3+OPBA3.2*JS4+OPBA3.3*JS1+OPBA3.4*JS2)*(SUM(I = -3 TO 0 : OPBA3C(I))*(1+(FPC02-SUM(I = -3 TO 0 : FPC02C(I)))/SUM(I = -3 TO 0 : FPC02C(I))))+OPBA3.6*IHG1(-1)

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.95513 CRSQ = 0.95209 F(4/59) = 313.969
SER = 7.0584 SSR = 2939.410 DW(0) = 1.36 COND(X) = 4.57
LHS MEAN = 87.70550 SR = 7.03334

COEF	VALUE	ST ER	T-STAT	MEAN
OPBA3.1	0.89703	0.02599	34.51190	22.85800
OPBA3.2	0.99810	0.02927	34.09830	20.61630
OPBA3.3	0.98893	0.02918	33.88730	21.21660
OPBA3.4	0.94793	0.02753	34.43090	22.52310
OPBA3.6	0.00148	7.35455E-04	2.01382	2823.72000

19: OPBA1C = BOPBA1C+JS3*(OPBA1C.0+OPBA1C.1*(OPBA3C-CROW)+OPBA1C.2*FIBA1C(-4)+OPBA1C.3*IHG1+OPBA1C.4*TIME)

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.9992 CRSQ = 0.99915 F(4/59) = 1.84E+04
SER = 1.0314 SSR = 62.758 DW(0) = 1.99 COND(X) = 20.29
LHS MEAN = 17.93810 SR = -0.00006

COEF	VALUE	ST ER	T-STAT	MEAN
OPBA1C.0	6.86096	1.92556	3.56309	0.25000
OPBA1C.1	0.95752	0.01334	71.77490	20.70360
OPBA1C.2	-4.14114	0.36451	-11.36070	0.43091
OPBA1C.3	-0.00438	5.20840E-04	-8.40730	709.27000
OPBA1C.4	0.07473	0.02210	3.38172	17.25000

20: OPBA1 = BOPBA1+(OPBA1.7*JS3+OPBA1.8*JS4+OPBA1.9*JS1+OPBA1.10*JS2)*SUM(I = -3 TO 0 : OPBA1C(I))+(OPBA1.1*JS3+OPBA1..
*JS4+OPBA1.3*JS1+OPBA1.4*JS2)*(OPBA3-SUM(I = -3 TO 0 : OPBA3C(I)))+OPBA1.5*FIBA1(-1)+OPBA1.6*IHG1(-1)

NOB = 64 NOVAR = 10
RANGE = 1967 3 TO 1983 2
RSQ = 0.99424 CRSQ = 0.99327 F(9/54) = 1034.760
SER = 2.7067 SSR = 395.613 DW(0) = 1.76 COND(X) = 9.40
LHS MEAN = 71.75260 SR = 1.57581

COEF	VALUE	ST ER	T-STAT	MEAN
OPBA1.7	0.96848	0.01272	76.12680	17.93810
OPBA1.8	1.01446	0.01689	60.06690	17.93810
OPBA1.9	1.02133	0.01339	76.26120	17.93810
OPBA1.10	1.00910	0.01183	85.31130	17.93810
OPBA1.1	0.73592	0.08465	8.69331	-0.24701
OPBA1.2	0.45932	0.13411	3.42495	-0.23718
OPBA1.3	0.28638	0.22047	1.30803	-0.01885
OPBA1.4	0.70113	0.10602	6.61304	0.30412
OPBA1.5	-0.62447	0.20028	-3.11794	6.53409
OPBA1.6	0.00138	4.39445E-04	3.14208	2823.72000

MODEL: OATS

SYMBOL DECLARATIONS

ENDOGENOUS:

DFOA1C	- OATS FEED, WASTE AND DOCKAGE DISAPPEARANCE, WESTERN CANADA (MIL T)
FIOA1	- OATS CLOSING QUARTERLY FARM INVENTORIES, WESTERN CANADA (MIL T)
FIOA1C	- OATS CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FMOA1	- OATS QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMOA1C	- OATS CROP YEAR FARM MARKETINGS, WESTERN CANADA (MIL T)
OPOA1	- OATS QUARTERLY OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPOA1C	- OATS CROP YEAR OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPOA3	- OATS QUARTERLY OFF-BOARD PRICE, THUNDER BAY ($/T)
OPOA3C	- OATS CROP YEAR OFF-BOARD PRICE, THUNDER BAY ($/T)
QOA1C	- OATS PRODUCTION, WESTERN CANADA (MIL T)
QOA2C	- OATS PRODUCTION, EASTERN CANADA (MIL T)

EXOGENOUS:

AOA1C	- OATS ACREAGE, WESTERN CANADA (00,000 ACRES)
AOA2C	- OATS ACREAGE, EASTERN CANADA (00,000 ACRES)
DDOA3C	- OATS FOOD + INDUSTRIAL DISAPPEARANCE, CANADA (MIL T)
DSOA1C	- OATS SEED DISAPPEARANCE, WESTERN CANADA (MIL T)
EXOA3C	- OATS EXPORTS, CANADA (MIL T)
FIBA1C	- BARLEY CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FPCO2	- CORN QUARTERLY ELEVATOR PRICE, CHATHAM ($/T)
FPCO2C	- CORN CROP YEAR ELEVATOR PRICE, CHATHAM ($/T)
IDC3S	- DAIRY COWS, CLOSING SEMI-ANNUAL NUMBER ON FARMS, CANADA (000)
IDH3S	- DAIRY HEIFERS, CLOSING SEMI-ANNUAL NUMBER ON FARMS, CANADA (000)
IHG1	- PIGS CLOSING QUARTERLY NUMBER ON FARMS, CANADA (000)
JS1	- SEASONAL DUMMY VARIABLE FOR FIRST QUARTER
JS2	- SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
JS3	- SEASONAL DUMMY VARIABLE FOR THIRD QUARTER
JS4	- SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
OPBA1C	- BARLEY CROP YEAR OFF-BOARD PRICE, WESTERN CANADA ($/T)
OPBA3C	- BARLEY CROP YEAR OFF-BOARD PRICE, THUNDER BAY ($/T)
QCO3C	- CORN PRODUCTION, CANADA (MIL T)
YOA1C	- OATS YIELD, WESTERN CANADA (KG/ACRE)
YOA2C	- OATS YIELD, EASTERN CANADA (KG/ACRE)

POLICY:

BDFOA1C BFIOA1 BFIOA1C BFMOA1 BFMOA1C BOPOA1 BOPOA1C BOPOA3 BOPOA3C BQOA1C BQOA2C

COEFFICIENT:

DFOA1C.0 DFOA1C.1 DFOA1C.2 DFOA1C.4 DFOA1C.5 FIOA1.0 FIOA1.1 FIOA1.2 FIOA1.3 FMOA1.0 FMOA1.1 FMOA1.11
FMOA1.12 FMOA1.13 FMOA1.2 FMOA1.4 FMOA1.5 FMOA1.6 FMOA1.7 FMOA1.8 FMOA1.9 FMOA1C.0 FMOA1C.1 FMOA1C.2
FMOA1C.3 FMOA1C.4 OPOA1.1 OPOA1.2 OPOA1.3 OPOA1.4 OPOA1.5 OPOA1.6 OPOA1C.0 OPOA1C.1 OPOA1C.2 OPOA1C.3
OPOA1C.5 OPOA3.1 OPOA3.2 OPOA3.3 OPOA3.4 OPOA3.5 OPOA3.6 OPOA3C.0 OPOA3C.1 OPOA3C.2 OPOA3C.4

EQUATIONS

```
  OATS PRODUCTION, WEST:
1:      QOA1C = BQOA1C+AOA1C*YOA1C/10000

  OATS PRODUCTION, EAST:
2:      QOA2C = BQOA2C+AOA2C*YOA2C/10000

  OATS FARM MARKETINGS, WEST (1967Q3-1983Q2):
3:      FMOA1C = BFMOA1C+JS3*(FMOA1C.0+FMOA1C.1*(DDOA3C+EXOA3C)+FMOA1C.2*OPOA1C+FMOA1C.3*(QOA1C+FIOA1C(-4))+
        FMOA1C.4*QC03C)

  OATS FARM MARKETINGS, WEST (1968Q3-1983Q2):
4:      FMOA1 = BFMOA1+JS3*(-0.03144-0.00139*(OPOA1-OPOA1(-1))+0.4648*(FIOA1(-1)-FIOA1C(-4))+FMOA1.0+FMOA1.1*(
        QOA1C+FIOA1C(-4))+FMOA1.2*OPOA1+FMOA1.4*(-0.03144-0.00139*(OPOA1-OPOA1(-1))+0.4648*(FIOA1(-1)-FIOA1C(-4)))
        )+JS4*(FMOA1.5+FMOA1.6*FMOA1C(-1)+FMOA1.7*(OPOA1-OPOA1(-1)))+JS1*(FMOA1.8+FMOA1.9*(FMOA1C(-2)-FMOA1(-1)))+
        JS2*(FMOA1.11+FMOA1.12*(FMOA1C(-3)-FMOA1(-1)-FMOA1(-2))+FMOA1.13*(OPOA1-OPOA1(-1)))

  OATS FEED USE, WEST (1967Q3-1983Q2):
5:      DFOA1C = BDFOA1C+JS3*(DFOA1C.0+DFOA1C.1*OPOA1C+DFOA1C.2*OPBA1C+DFOA1C.5*FIBA1C+DFOA1C.4*IHG1(-1))

  OATS CLOSING FARM STOCKS, WEST:
6:      FIOA1C = BFIOA1C+JS3*(QOA1C+FIOA1C(-4)-FMOA1C-DFOA1C-DSOA1C)

  OATS CLOSING FARM STOCKS, WEST (1969Q3-1983Q2):
7:      FIOA1 = BFIOA1+(IF JS3 EQ 1 THEN QOA1C+FIOA1(-1)-FMOA1+FIOA1.0*DFOA1C ELSE FIOA1(-1)-FMOA1+FIOA1.1*JS4*
        DFOA1C(-1)+FIOA1.2*JS1*DFOA1C(-2)+FIOA1.3*JS2*DFOA1C(-3)-JS2*DSOA1C(-3))

  OATS OFF-BOARD PRICE, THUNDER BAY (1967Q3-1983Q2):
8:      OPOA3C = BOPOA3C+JS3*(OPOA3C.0+OPOA3C.4*OPBA3C+OPOA3C.1*(QOA1C+FIOA1C(-4))+OPOA3C.2*FIBA1C)

  OATS OFF-BOARD PRICE, THUNDER BAY (1969Q3-1983Q2):
9:      OPOA3 = BOPOA3+(OPOA3.1*JS3+OPOA3.2*JS4+OPOA3.3*JS1+OPOA3.4*JS2)*(SUM(I = -3 TO 0 : OPOA3C(I))*(1+(FPC02-
        SUM(I = -3 TO 0 : FPC02C(I)))/SUM(I = -3 TO 0 : FPC02C(I))))+OPOA3.5*FIOA1(-1)+OPOA3.6*SUM(I = -2 TO -1 :
        IDH3S(I)+IDC3S(I))

  OATS OFF-BOARD PRICE, PRAIRIES (1969Q3-1983Q2):
10:     OPOA1C = BOPOA1C+JS3*(OPOA1C.0+OPOA1C.1*OPOA3C+OPOA1C.2*(QOA1C+FIOA1C(-4))+OPOA1C.3*IHG1(-1)+OPOA1C.5*
        OPBA1C)

  OATS OFF-BOARD PRICE, PRAIRIES (1969Q3-1983Q2):
11:     OPOA1 = BOPOA1+(OPOA1.1*JS3+OPOA1.2*JS4+OPOA1.3*JS1+OPOA1.4*JS2)*(SUM(I = -3 TO 0 : OPOA1C(I))*(1+(OPOA3-
        SUM(I = -3 TO 0 : OPOA3C(I)))/SUM(I = -3 TO 0 : OPOA3C(I))))+OPOA1.5*FIOA1(-1)+OPOA1.6*IHG1(-1)
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3:  FMOA1C = BFMOA1C+JS3*(FMOA1C.0+FMOA1C.1*(DDOA3C+EXOA3C)+FMOA1C.2*OPOA1C+FMOA1C.3*(QOA1C+FIOA1C(-4))+FMOA1C.4*QC03C)

NOB = 64      NOVAR = 5
RANGE =  1967 3 TO 1983 2
RSQ =   0.94332      CRSQ =   0.93948      F(4/59) =   245.492
SER =   0.0640       SSR =    0.242        DW(0) =  2.00      COND(X) =    36.21
```

LHS MEAN = 0.13932 SR = -0.

COEF	VALUE	ST ER	T-STAT	MEAN
FMOA1C.0	-0.30611	0.21914	-1.39690	0.25000
FMOA1C.1	0.68161	0.14872	4.58324	0.04746
FMOA1C.2	0.00412	0.00106	3.89232	16.52440
FMOA1C.3	0.12916	0.03507	3.68325	1.07960
FMOA1C.4	-0.02571	0.01661	-1.54836	0.93489

4: FMOA1 = BFMOA1+JS3*(-0.03144-0.00139*(OPOA1-OPOA1(-1))+0.4648*(FIOA1(-1)-FIOA1C(-4))+FMOA1.0+FMOA1.1*(QOA1C+FIOA1C(-4))+FMOA1.2*OPOA1+FMOA1.4*(-0.03144-0.00139*(OPOA1-OPOA1(-1))+0.4648*(FIOA1(-1)-FIOA1C(-4))))+JS4*(FMOA1.5+FMOA1.6*FMOA1C(-1)+FMOA1.7*(OPOA1-OPOA1(-1)))+JS1*(FMOA1.8+FMOA1.9*(FMOA1C(-2)-FMOA1(-1)))+JS2*(FMOA1.11+FMOA1.12*(FMOA1C(-3)-FMOA1(-1)-FMOA1(-2))+FMOA1.13*(OPOA1-OPOA1(-1)))

NOB = 60 NOVAR = 12
RANGE = 1968 3 TO 1983 2
RSQ = 0.59903 CRSQ = 0.50715 F(11/48) = 6.519
SER = 0.0422 SSR = 8.560E-02 DW(0) = 1.98 COND(X) = 30.03
LHS MEAN = 0.15365 SR = 0.

COEF	VALUE	ST ER	T-STAT	MEAN
FMOA1.0	-0.15606	0.13341	-1.16980	0.25000
FMOA1.1	0.04240	0.02183	1.94212	1.08253
FMOA1.2	0.00112	7.58634E-04	1.47067	16.39970
FMOA1.4	-0.30353	0.27438	-1.10625	0.02654
FMOA1.5	0.04665	0.03512	1.32852	0.25000
FMOA1.6	0.20612	0.05894	3.49734	0.14069
FMOA1.7	0.00274	0.00154	1.78380	0.15961
FMOA1.8	0.02040	0.02929	0.69671	0.25000
FMOA1.9	0.29237	0.06823	4.28495	0.09959
FMOA1.11	0.05957	0.02775	2.14689	0.25000
FMOA1.12	0.30923	0.09420	3.28261	0.06537
FMOA1.13	0.00165	0.00245	0.67638	-0.26627

5: DFOA1C = BDFOA1C+JS3*(DFOA1C.0+DFOA1C.1*OPOA1C+DFOA1C.2*OPBA1C+DFOA1C.5*FIBA1C+DFOA1C.4*IHG1(-1))

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.98707 CRSQ = 0.98619 F(4/59) = 1126.090
SER = 0.1444 SSR = 1.229 DW(0) = 1.89 COND(X) = 94.29
LHS MEAN = 0.67966 SR = -0.00005

COEF	VALUE	ST ER	T-STAT	MEAN
DFOA1C.0	3.52785	0.31643	11.14900	0.25000

DFOA1C.1	-0.08138	0.01610	-5.05397	16.52440
DFOA1C.2	0.05503	0.01389	3.96271	17.93810
DFOA1C.5	-0.15722	0.05375	-2.92494	0.45722
DFOA1C.4	3.28539E-04	7.44275E-05	4.41422	691.56200

7: FIOA1 = BFIOA1+(IF JS3 EQ 1 THEN QOA1C+FIOA1(-1)-FMOA1+FIOA1.0*DFOA1C ELSE FIOA1(-1)-FMOA1+FIOA1.1*JS4*DFOA1C(-1)+FIOA1.2*JS1*DFOA1C(-2)+FIOA1.3*JS2*DFOA1C(-3)-JS2*DSOA1C(-3))

NOB = 56 NOVAR = 4
RANGE = 1969 3 TO 1983 2
RSQ = 0.99845 CRSQ = 0.99836 F(3/52) = 1.12E+04
SER = 0.0499 SSR = 0.129 DW(0) = 1.80 COND(X) = 1.00
LHS MEAN = 2.49994 SR = -0.12857

COEF	VALUE	ST ER	T-STAT	MEAN
FIOA1.0	-0.20335	0.00474	-42.92640	0.68334
FIOA1.1	-0.27778	0.00474	-58.63950	0.68334
FIOA1.2	-0.27919	0.00474	-58.93620	0.68334
FIOA1.3	-0.22330	0.00474	-47.13750	0.68334

8: OPOA3C = BOPOA3C+JS3*(OPOA3C.0+OPOA3C.4*OPBA3C+OPOA3C.1*(QOA1C+FIOA1C(-4))+OPOA3C.2*FIBA1C)

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.99906 CRSQ = 0.99901 F(3/60) = 2.12E+04
SER = 1.2614 SSR = 95.472 DW(0) = 1.96 COND(X) = 33.47
LHS MEAN = 21.23120 SR = -0.00017

COEF	VALUE	ST ER	T-STAT	MEAN
OPOA3C.0	20.29210	4.58014	4.43045	0.25000
OPOA3C.4	0.88794	0.01972	45.03610	21.97610
OPOA3C.1	-3.46303	0.57232	-6.05087	1.07960
OPOA3C.2	0.83843	0.48907	1.71434	0.45722

9: OPOA3 = BOPOA3+(OPOA3.1*JS3+OPOA3.2*JS4+OPOA3.3*JS1+OPOA3.4*JS2)*(SUM(I = -3 TO 0 : OPOA3C(I))*(1+(FPC02-SUM(I = -3 TO 0 : FPC02C(I)))/SUM(I = -3 TO 0 : FPC02C(I))))+OPOA3.5*FIOA1(-1)+OPOA3.6*SUM(I = -2 TO -1 : IDH3S(I)+IDC3S(I))

NOB = 56 NOVAR = 6
RANGE = 1969 3 TO 1983 2
RSQ = 0.94549 CRSQ = 0.94003 F(5/50) = 173.439
SER = 7.5593 SSR = 2857.170 DW(0) = 1.38 COND(X) = 14.07

LHS MEAN = 89.09130 SR = 8.35638

COEF	VALUE	ST ER	T-STAT	MEAN
OPOA3.1	0.79038	0.05005	15.79240	23.08260
OPOA3.2	0.99342	0.03449	28.80560	20.90920
OPOA3.3	0.98739	0.03594	27.47060	21.47640
OPOA3.4	0.88031	0.04128	21.32390	22.86110
OPOA3.5	-3.19434	1.74351	-1.83213	2.50975
OPOA3.6	0.00610	0.00242	2.51697	2724.25000

10: OPOA1C = BOPOA1C+JS3*(OPOA1C.0+OPOA1C.1*OPOA3C+OPOA1C.2*(QOA1C+FIOA1C(-4))+OPOA1C.3*IHG1(-1)+OPOA1C.5*OPBA1C)

NOB = 56 NOVAR = 5
RANGE = 1969 3 TO 1983 2
RSQ = 0.99976 CRSQ = 0.99974 F(4/51) = 5.29E+04
SER = 0.5415 SSR = 14.952 DW(0) = 1.96 COND(X) = 72.51
LHS MEAN = 17.51180 SR = 0.00015

COEF	VALUE	ST ER	T-STAT	MEAN
OPOA1C.0	17.58580	2.23651	7.86305	0.25000
OPOA1C.1	0.29877	0.03892	7.67604	22.27280
OPOA1C.2	-2.40496	0.30807	-7.80662	1.07693
OPOA1C.3	-9.35463E-04	2.88106E-04	-3.24694	703.80300
OPOA1C.5	0.50805	0.03345	15.19060	19.11080

11: OPOA1 = BOPOA1+(OPOA1.1*JS3+OPOA1.2*JS4+OPOA1.3*JS1+OPOA1.4*JS2)*(SUM(I = -3 TO 0 : OPOA1C(I))*(1+(OPOA3-SUM(I = -3 TO 0 : OPOA3C(I)))/SUM(I = -3 TO 0 : OPOA3C(I))))+OPOA1.5*FIOA1(-1)+OPOA1.6*IHG1(-1)

NOB = 56 NOVAR = 6
RANGE = 1969 3 TO 1983 2
RSQ = 0.99026 CRSQ = 0.98929 F(5/50) = 1016.780
SER = 2.9065 SSR = 422.387 DW(0) = 1.43 COND(X) = 9.50
LHS MEAN = 70.04740 SR = 4.34897

COEF	VALUE	ST ER	T-STAT	MEAN
OPOA1.1	0.98049	0.01842	53.21830	16.91190
OPOA1.2	0.99133	0.01481	66.92420	17.37590
OPOA1.3	1.00748	0.01404	71.76210	18.05180
OPOA1.4	1.00730	0.01561	64.53020	17.70780
OPOA1.5	-0.48024	0.49621	-0.96782	2.50975
OPOA1.6	4.67221E-04	5.87154E-04	0.79574	2876.34000

APPENDIX F

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MODEL: RYE


SYMBOL DECLARATIONS


ENDOGENOUS:
   ARY1C     - RYE ACREAGE, WESTERN CANADA (MIL T)
   FPRY1     - RYE QUARTERLY FARM PRICE, WESTERN CANADA ($/T)
   QRY1C     - RYE PRODUCTION, WESTERN CANADA (MIL T)

EXOGENOUS:
   CROW      - TRANSPORTATION COST, SCOTT SASKATCHEWAN TO PORT ($/T)
   OPBA1     - BARLEY QUARTERLY OFF-BOARD PRICE, WESTERN CANADA ($/T)
   XIPWH1    - WHEAT CWB INITIAL PRICE + ADJUSTMENTS, NO 1 CWRS, THUNDER BAY ($/T)
   YRY1C     - RYE YIELD, WESTERN CANADA (KG/ACRE)

POLICY:
   BFPRY1  BQRY1C

COEFFICIENT:
   FPRY1.0  FPRY1.1  FPRY1.2


EQUATIONS


      RYE PRODUCTION, WEST:
    1:       QRY1C = BQRY1C+ARY1C*YRY1C/10000

      RYE FARM PRICE, WEST (1969Q3-1983Q2):
    2:       FPRY1 = BFPRY1+FPRY1.0+FPRY1.1*OPBA1+FPRY1.2*(XIPWH1-CROW)




2:  FPRY1 = BFPRY1+FPRY1.0+FPRY1.1*OPBA1+FPRY1.2*(XIPWH1-CROW)


NOB = 56     NOVAR = 3
RANGE =  1969 3 TO 1983 2
RSQ =   0.81125     CRSQ =   0.80413     F(2/53) =   113.896
SER =  19.4039      SSR = 19955.100      DW(0) =  0.51     COND(X) =    11.43
LHS MEAN =     88.71870     SR =     -0.00003

COEF          VALUE          ST ER          T-STAT          MEAN

FPRY1.0      -8.21310        7.09966       -1.15683        1.00000
FPRY1.1       0.91511        0.15042        6.08391       76.44340
FPRY1.2       0.24146        0.10933        2.20865      111.72400
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APPENDIX G

MODEL: CORN

SYMBOL DECLARATIONS

ENDOGENOUS:
- DDC03C - CORN CROP YEAR FOOD + INDUSTRIAL DISAPPEARANCE, CANADA (MIL T)
- DSCC03C - CORN CROP YEAR SEED, FEED, WASTE AND DOCKAGE DISAPPEARANCE, CANADA (MIL T)
- EXC03C - CORN EXPORTS, CANADA (MIL T)
- FPC02 - CORN QUARTER ELEVATOR PRICE, CHATHAM ($/T)
- FPC02C - CORN CROP YEAR ELEVATOR PRICE, CHATHAM ($/T)
- IC03C - CORN CLOSING CROP YEAR INVENTORIES, CANADA (MIL T)
- IMC03C - CORN CROP YEAR IMPORTS, CANADA (MIL T)
- QC03C - CORN PRODUCTION, CANADA (MIL T)

EXOGENOUS:
- AC03C - CORN ACREAGE, CANADA (00,000 ACRES)
- D1980 - DUMMY VARIABLE FOR U.S. GRAIN EMBARGO
- ER34 - QUARTERLY EXCHANGE RATE (CDN $/US $)
- ER34C - CROP YEAR EXCHANGE RATE (CDN $/US $)
- EXPBA3C - BARLEY CROP YEAR UNIT VALUE EXPORT PRICE, CANADA ($/T)
- IBA3C - BARLEY CLOSING CROP YEAR INVENTORIES, CANADA ($/T)
- IHG2 - PIGS QUARTERLY CLOSING NUMBER ON FARMS, EASTERN CANADA (000)
- JS1 - SEASONAL DUMMY VARIABLE FOR FIRST QUARTER
- JS2 - SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
- JS3 - SEASONAL DUMMY VARIABLE FOR THIRD QUARTER
- JS4 - SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
- OPBA3C - BARLEY CROP YEAR OFF-BOARD PRICE, THUNDER BAY ($/T)
- PC04 - CORN QUARTERLY PRICE, CHICAGO (US $/T)
- PC04C - CORN CROP YEAR PRICE, CHICAGO (US $/T)
- PHG2 - HOGS QUARTERLY PRICE, INDEX 100, TORONTO ($/CWT)
- QBA1C - BARLEY PRODUCTION, WESTERN CANADA (MIL T)
- QBA2C - BARLEY PRODUCTION, EASTERN CANADA (MIL T)
- TIMEC - TIME TREND - CONSTANT AFTER 1984 2
- XTC03 - CORN TARIFF, CANADA ($/T)
- YC03C - CORN YIELD, CANADA (KG/ACRES)
- YEARQ - QUARTERLY TREND VARIABLE

POLICY:
BDDC03C BDFC03C BEXC03C BFPC02 BFPC02C BIC03C BIMC03C BQC03C

COEFFICIENT:
DDC03C.0 DDC03C.1 DFC03C.0 DFC03C.1 DFC03C.3 DFC03C.4 DFC03C.6 EXC03C.0 EXC03C.1 EXC03C.2 EXC03C.3
EXC03C.4 EXC03C.6 FPC02.1 FPC02.2 FPC02.3 FPC02.4 FPC02.5 FPC02.6 FPC02C.0 FPC02C.1 FPC02C.2 FPC02C.3
IMC03C.0 IMC03C.1 IMC03C.2 IMC03C.3

EQUATIONS

CORN PRODUCTION, CANADA:

```
1:      QC03C = BQC03C+AC03C*YC03C/10000

  CORN FOOD + INDUSTRIAL USE, CANADA (1967Q3-1983Q2):
2:      DDC03C = BDDC03C+JS3*(DDC03C.0+DDC03C.1*(QC03C+IMC03C))

  CORN FEED + SEED USE, CANADA (1967Q3-1983Q2):
3:      DSCC03C = BDFC03C+JS3*(DFC03C.0+DFC03C.1*TIMEC+DFC03C.3*FPC02C/SUM(I = -3 TO 0 : OPBA3C(I))+DFC03C.4*IHG2(
        -1)+DFC03C.6*PHG2/PHG2(-4))

  CORN IMPORTS, CANADA (1967Q3-1983Q2):
4:      IMC03C = BIMC03C+JS3*(IMC03C.0+IMC03C.3*OPBA3C+IMC03C.1*(QC03C-DSCC03C)+IMC03C.2*((PC04C*ER34C+XTC03)/SUM(
        I = -3 TO 0 : FPC02C(I))))

  CORN EXPORTS, CANADA (1967Q3-1983Q2):
5:      EXC03C = BEXC03C+JS3*(EXC03C.0+EXC03C.1*QC03C+EXC03C.2*D1980+EXC03C.3*ER34C+EXC03C.4*FPC02C+EXC03C.6*
        EXPBA3C)

  CORN CLOSING INVENTORIES, CANADA:
6:      IC03C = BIC03C+(IF YEARQ NE 19753 THEN JS3*(QC03C+IMC03C+IC03C(-4)-DDC03C-DSCC03C-EXC03C) ELSE JS3*(QC03C+
        IMC03C+IC03C(-4)-DDC03C-DSCC03C-EXC03C+0.5565))

  CORN ELEVATOR PRICE, CHATHAM (1967Q3-1983Q2):
7:      FPC02C = BFPC02C+JS3*(FPC02C.0+FPC02C.1*PC04C*ER34C+FPC02C.2*QC03C+FPC02C.3*(QBA1C+QBA2C+IBA3C(-4)))

  CORN ELEVATOR PRICE, CHATHAM (1967Q3-1983Q2):
8:      FPC02 = BFPC02+(FPC02.1*JS4+FPC02.2*JS1+FPC02.3*JS2+FPC02.4*JS3)*(SUM(I = -4 TO -1 : FPC02C(I))*(1+(PC04-
        SUM(I = -4 TO -1 : PC04C(I)))/SUM(I = -4 TO -1 : PC04C(I))))+FPC02.5*SUM(I = -4 TO -1 : QC03C(I))+FPC02.6*
        ER34
```

```
2:  DDC03C = BDDC03C+JS3*(DDC03C.0+DDC03C.1*(QC03C+IMC03C))

NOB = 64      NOVAR = 2
RANGE =  1967 3 TO 1983 2
RSQ =    0.99291      CRSQ =    0.9928      F(1/62) =  8686.950
SER =    0.0305       SSR = 5.769E-02       DW(0) =  1.88      COND(X) =      5.73
LHS MEAN =       0.20127      SR =      -0.

COEF            VALUE           ST ER          T-STAT          MEAN

DDC03C.0       0.42136         0.02250        18.72540        0.25000
DDC03C.1       0.08485         0.00468        18.12530        1.13057
```

```
3:  DSCC03C = BDFC03C+JS3*(DFC03C.0+DFC03C.1*TIMEC+DFC03C.3*FPC02C/SUM(I = -3 TO 0 : OPBA3C(I))+DFC03C.4*IHG2(-1)+
DFC03C.6*PHG2/PHG2(-4))

NOB = 64      NOVAR = 5
```

```
RANGE =  1967 3 TO 1983 2
RSQ =    0.99814      CRSQ =    0.99802      F(4/59) =  7929.690
SER =    0.0706       SSR =     0.294        DW(0) =    1.92      COND(X) =    32.23
LHS MEAN =      0.84897      SR =      0.00004
```

COEF	VALUE	ST ER	T-STAT	MEAN
DFC03C.0	-1.85838	0.19323	-9.61742	0.25000
DFC03C.1	0.12965	0.00740	17.52320	6.37500
DFC03C.3	-0.22180	0.15898	-1.39511	0.25920
DFC03C.4	3.89036E-04	2.41179E-05	16.13050	1139.96000
DFC03C.6	0.36955	0.07260	5.09044	0.27344

```
4:  IMC03C = BIMC03C+JS3*(IMC03C.0+IMC03C.3*QPBA3C+IMC03C.1*(QC03C-QSCC03C)+IMC03C.2*((PC04C*ER34C+XTC03)/SUM(I = -3 TO
0 : FPC02C(I))))

NOB = 64      NOVAR = 4
RANGE =  1967 3 TO 1983 2
RSQ =    0.97478      CRSQ =    0.97352      F(3/60) =   773.071
SER =    0.0605       SSR =     0.219        DW(0) =    1.98      COND(X) =    89.17
LHS MEAN =      0.19568      SR =      0.00002
```

COEF	VALUE	ST ER	T-STAT	MEAN
IMC03C.0	3.56081	0.52120	6.83200	0.25000
IMC03C.3	0.00716	5.35859E-04	13.35760	21.97610
IMC03C.1	-0.07231	0.04751	-1.52189	0.08592
IMC03C.2	-3.08033	0.47293	-6.51323	0.27452

```
5:  EXC03C = BEXC03C+JS3*(EXC03C.0+EXC03C.1*QC03C+EXC03C.2*D1980+EXC03C.3*ER34C+EXC03C.4*FPC02C+EXC03C.6*EXPBA3C)

NOB = 64      NOVAR = 6
RANGE =  1967 3 TO 1983 2
RSQ =    0.97858      CRSQ =    0.97674      F(5/58) =   530.059
SER =    0.0338       SSR =  6.640E-02       DW(0) =    1.97      COND(X) =    76.12
LHS MEAN =      0.06609      SR =      0.00001
```

COEF	VALUE	ST ER	T-STAT	MEAN
EXC03C.0	-0.61541	0.18375	-3.34920	0.25000
EXC03C.1	0.11741	0.01482	7.91957	0.93489
EXC03C.2	0.74948	0.04036	18.56850	0.02344
EXC03C.3	0.50656	0.19579	2.58719	0.27047
EXC03C.4	-0.00875	9.37618E-04	-9.33699	22.58650
EXC03C.6	0.00587	7.80478E-04	7.52188	26.11870

7: FPC02C = BFPC02C+JS3*(FPC02C.0+FPC02C.1*PC04C*ER34C+FPC02C.2*QC03C+FPC02C.3*(QBA1C+QBA2C+IBA3C(-4)))

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.99871 CRSQ = 0.99865 F(3/60) = 1.55E+04
SER = 1.5608 SSR = 146.165 DW(0) = 2.00 COND(X) = 20.45
LHS MEAN = 22.58650 SR = 0.

COEF	VALUE	ST ER	T-STAT	MEAN
FPC02C.0	12.00680	2.54804	4.71218	0.25000
FPC02C.1	0.99214	0.01899	52.24820	24.08400
FPC02C.2	-2.25000	0.48693	-4.62078	0.93489
FPC02C.3	-0.63463	0.21839	-2.90590	3.47660

8: FPC02 = BFPC02+(FPC02.1*JS4+FPC02.2*JS1+FPC02.3*JS2+FPC02.4*JS3)*(SUM(I = -4 TO -1 : FPC02C(I))*(1+(PC04-SUM(I = -4 TO -1 : PC04C(I)))/SUM(I = -4 TO -1 : PC04C(I))))+FPC02.5*SUM(I = -4 TO -1 : QC03C(I))+FPC02.6*ER34

NOB = 64 NOVAR = 6
RANGE = 1967 3 TO 1983 2
RSQ = 0.98711 CRSQ = 0.986 F(5/58) = 888.418
SER = 3.8739 SSR = 870.432 DW(0) = 1.35 COND(X) = 8.72
LHS MEAN = 89.32510 SR = -1.20509

COEF	VALUE	ST ER	T-STAT	MEAN
FPC02.1	0.97881	0.02367	41.34900	21.29720
FPC02.2	0.97128	0.02316	41.93970	22.19180
FPC02.3	1.00121	0.02251	44.47740	23.12810
FPC02.4	1.02869	0.02173	47.33900	22.34700
FPC02.5	-0.07101	0.47563	-0.14930	3.66413
FPC02.6	0.97920	1.53161	0.63933	1.08190

APPENDIX H

MODEL: CANOLA

SYMBOL DECLARATIONS

ENDOGENOUS:

CIRA3C	- CANOLA CLOSING CROP YEAR COMMERCIAL INVENTORIES, CANADA (MIL T)
DDRA3C	- CANOLA CROP YEAR FOOD + INDUSTRIAL DISAPPEARANCE, CANADA (MIL T)
FIRA3C	- CANOLA CLOSING CROP YEAR FARM INVENTORIES, CANADA (MIL T)
FMRA3	- CANOLA QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMRA3C	- CANOLA CROP YEAR FARM MARKETINGS, WESTERN CANADA (MIL T)
FPRA1	- CANOLA QUARTERLY FARM PRICE, WESTERN CANADA ($/T)
FPRA1C	- CANOLA CROP YEAR FARM PRICE, WESTERN CANADA ($/T)
IRA3C	- CANOLA CLOSING CROP YEAR INVENTORIES, CANADA (MIL T)
PRA3	- CANOLA QUARTERLY PRICE, VANCOUVER ($/T)
PRA3C	- CANOLA CROP YEAR PRICE, VANCOUVER ($/T)
QRA3C	- CANOLA PRODUCTION, CANADA (MIL T)

EXOGENOUS:

ARA3C	- CANOLA ACREAGE, CANADA (00,000 ACRES)
CROW	- TRANSPORTATION COST, SCOTT SASKATCHEWAN TO PORT ($/T)
DSCRA1C	- CANOLA CROP YEAR SEED, FEED, WASTE AND DOCKAGE DISAPPEARANCE, WESTERN CANADA (MIL T)
DSCRA3C	- CANOLA CROP YEAR SEED, FEED, WASTE AND DOCKAGE DISAPPEARANCE, CANADA (MIL T)
ER34	- QUARTERLY EXCHANGE RATE (CDN $/ US $)
ER34C	- CROP YEAR EXCHANGE RATE (CDN $/ US $)
EXRA3C	- CANOLA EXPORTS, CANADA (MIL T)
JS1	- SEASONAL DUMMY VARIABLE FOR FIRST QUARTER
JS2	- SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
JS3	- SEASONAL DUMMY VARIABLE FOR THIRD QUARTER
JS4	- SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
POPN3	- POPULATION, CANADA (MIL)
PSL4	- SOYBEAN OIL QUARTERLY PRICE, DECATUR (US $/T)
PSL4C	- SOYBEAN OIL CROP YEAR PRICE, DECATUR (US $/T)
PSM4	- SOYBEAN MEAL QUARTERLY PRICE, DECATUR (US $/T)
PSM4C	- SOYBEAN MEAL CROP YEAR PRICE, DECATUR (US $/T)
TIME	- TIME TREND
XTSL	- SOYBEAN OIL TARIFF, CANADA ($/T)
YRA3C	- CANOLA YIELD, CANADA (KG/ACRE)

POLICY:

BCIRA3C BDDRA3C BFIRA3C BFMRA3 BFMRA3C BFPRA1 BFPRA1C BIRA3C BPRA3 BPRA3C BQRA3C

COEFFICIENT:

DDRA3C.0 DDRA3C.1 DDRA3C.2 FMRA3.1 FMRA3.10 FMRA3.11 FMRA3.12 FMRA3.13 FMRA3.2 FMRA3.3 FMRA3.6 FMRA3.7
FMRA3.8 FMRA3.9 FMRA3C.0 FMRA3C.1 FMRA3C.2 FMRA3C.3 FPRA1.1 FPRA1.2 FPRA1.3 FPRA1.4 FPRA1C.0 FPRA1C.1
FPRA1C.3 FPRA1C.4 FPRA1C.5 PRA3.1 PRA3.10 PRA3.2 PRA3.3 PRA3.4 PRA3.5 PRA3.6 PRA3.7 PRA3.8 PRA3.9
PRA3C.0 PRA3C.2 PRA3C.4 PRA3C.6

EQUATIONS

```
  CANOLA PRODUCTION, CANADA:
1:      QRA3C = BQRA3C+ARA3C*YRA3C/10000

  CANOLA FARM MARKETINGS, CANADA (1967Q3-1983Q2):
2:      FMRA3C = BFMRA3C+JS3*(FMRA3C.0+FMRA3C.1*(DDRA3C+EXRA3C-CIRA3C(-4))+FMRA3C.2*PRA3C/SUM(I = -3 TO 0 : FPRA1C
        (I))+FMRA3C.3*(QRA3C+FIRA3C(-4)))

  CANOLA FARM MARKETINGS, CANADA (1968Q3-1983Q2):
3:      FMRA3 = BFMRA3+JS3*(0.03408+0.43308*FIRA3C(-4)-0.000504*(PRA3-PRA3(-1))+0.29283*(FMRA3C(-4)-FMRA3(-1)-
        FMRA3(-2)-FMRA3(-3))+FMRA3.1*CIRA3C(-4)+FMRA3.2*(QRA3C+FIRA3C(-4))+FMRA3.3*(FPRA1-FPRA1(-1)))+JS4*(FMRA3.5
        *FMRA3C(-1)+FMRA3.7*(FPRA1-FPRA1(-1)))+JS1*(FMRA3.8+FMRA3.9*(FPRA1-FPRA1(-1))+FMRA3.10*(FMRA3C(-2)-FMRA3(
        -1)))+JS2*(FMRA3.11+FMRA3.12*(FPRA1-FPRA1(-1))+FMRA3.13*(FMRA3C(-3)-FMRA3(-1)-FMRA3(-2)))

  CANOLA CLOSING FARM STOCKS, WEST:
4:      FIRA3C = BFIRA3C+JS3*(QRA3C+FIRA3C(-4)-FMRA3C-DSCRA1C)

  CANOLA FOOD + INDUSTRIAL USE, CANADA (1967Q3-1983Q2):
5:      DDRA3C = BDDRA3C+JS3*(DDRA3C.0+DDRA3C.1*(0.41*PSL4C*ER34C*XTSL+0.58*PSM4C*ER34C*(IF TIME GT 86 THEN 0.75
         ELSE 0.65))/SUM(I = -3 TO 0 : FPRA1C(I))+DDRA3C.2*POPN3)

  CANOLA CLOSING COMMERCIAL STOCKS, CANADA:
6:      CIRA3C = BCIRA3C+JS3*(QRA3C+IRA3C(-4)-DDRA3C-DSCRA3C-EXRA3C-FIRA3C)

  CANOLA CLOSING STOCKS, CANADA:
7:      IRA3C = BIRA3C+CIRA3C+FIRA3C

  CANOLA PRICE, VANCOUVER (1967Q3-1983Q2):
8:      PRA3C = BPRA3C+JS3*(PRA3C.0+PRA3C.4*EXRA3C+PRA3C.6*PSM4C*ER34C+PRA3C.2*PSL4C*ER34C)

  CANOLA PRICE, VANCOUVER (1967Q3-1983Q2):
9:      PRA3 = BPRA3+(PRA3.1*JS4+PRA3.2*JS1+PRA3.3*JS2+PRA3.4*JS3)*(SUM(I = -4 TO -1 : PRA3C(I))*(1+(PSL4-SUM(I =
        -4 TO -1 : PSL4C(I)))/SUM(I = -4 TO -1 : PSL4C(I))))+(PRA3.5*JS4+PRA3.6*JS1+PRA3.7*JS2+PRA3.8*JS3)*SUM(I
         = -4 TO -1 : PRA3C(I))*(1+(PSM4-SUM(I = -4 TO -1 : PSM4C(I)))/SUM(I = -4 TO -1 : PSM4C(I)))+PRA3.9*QRA3C+
        PRA3.10*ER34

  CANOLA FARM PRICE, WEST (1967Q3-1983Q2):
10:     FPRA1C = BFPRA1C+JS3*(FPRA1C.0+FPRA1C.1*(PRA3C-CROW)+FPRA1C.3*QRA3C+FPRA1C.4*TIME+FPRA1C.5*CIRA3C(-4))

  CANOLA FARM PRICE, WEST (1967Q3-1983Q2):
11:     FPRA1 = BFPRA1+(FPRA1.1*JS3+FPRA1.2*JS4+FPRA1.3*JS1+FPRA1.4*JS2)*(SUM(I = -3 TO 0 : FPRA1C(I))*(1+(PRA3-
        SUM(I = -3 TO 0 : PRA3C(I)))/SUM(I = -3 TO 0 : PRA3C(I))))
```

```
2:  FMRA3C = BFMRA3C+JS3*(FMRA3C.0+FMRA3C.1*(DDRA3C+EXRA3C-CIRA3C(-4))+FMRA3C.2*PRA3C/SUM(I = -3 TO 0 : FPRA1C(I))+
FMRA3C.3*(QRA3C+FIRA3C(-4)))


NOB = 64     NOVAR = 4
RANGE =  1967 3 TO 1983 2
RSQ =   0.99925     CRSQ =   0.99921     F(3/60) =  2.67E+04
SER =   0.0212      SSR = 2.701E-02      DW(0) =  1.95     COND(X) =    39.36
```

LHS MEAN = 0.37544 SR = 0.00001

COEF	VALUE	ST ER	T-STAT	MEAN
FMRA3C.0	-0.15354	0.07670	-2.00195	0.25000
FMRA3C.1	0.44172	0.02623	16.83950	0.26436
FMRA3C.2	0.09227	0.06448	1.43105	0.29005
FMRA3C.3	0.58648	0.01472	39.83300	0.46088

3: FMRA3 = BFMRA3+JS3*(0.03408+0.43308*FIRA3C(-4)-0.000504*(PRA3-PRA3(-1))+0.29283*(FMRA3C(-4)-FMRA3(-1)-FMRA3(-2)-FMRA3(-3))+FMRA3.1*CIRA3C(-4)+FMRA3.2*(QRA3C+FIRA3C(-4))+FMRA3.3*(FPRA1-FPRA1(-1)))+JS4*(FMRA3.6*FMRA3C(-1)+FMRA3.7*(FPRA1-FPRA1(-1)))+JS1*(FMRA3.8+FMRA3.9*(FPRA1-FPRA1(-1))+FMRA3.10*(FMRA3C(-2)-FMRA3(-1)))+JS2*(FMRA3.11+FMRA3.12*(FPRA1-FPRA1(-1))+FMRA3.13*(FMRA3C(-3)-FMRA3(-1)-FMRA3(-2)))

NOB = 60 NOVAR = 11
RANGE = 1968 3 TO 1983 2
RSQ = 0.86404 CRSQ = 0.83629 F(10/49) = 31.139
SER = 0.0812 SSR = 0.323 DW(0) = 1.29 COND(X) = 4.84
LHS MEAN = 0.39167 SR = -0.0046

COEF	VALUE	ST ER	T-STAT	MEAN
FMRA3.1	-0.21724	0.09026	-2.40675	0.11469
FMRA3.2	0.15543	0.02306	6.73883	0.48185
FMRA3.3	0.00212	7.98462E-04	2.65022	0.47000
FMRA3.6	0.27749	0.01212	22.89180	0.39291
FMRA3.7	0.00193	8.60211E-04	2.24513	0.28333
FMRA3.8	0.06294	0.04974	1.26525	0.25000
FMRA3.9	0.00118	5.80435E-04	2.02548	0.69949
FMRA3.10	0.26471	0.03956	6.69167	0.28376
FMRA3.11	-0.05418	0.04571	-1.18525	0.25000
FMRA3.12	0.00132	0.00116	1.13923	1.75424
FMRA3.13	0.50986	0.05185	9.83262	0.19209

5: DDRA3C = BDDRA3C+JS3*(DDRA3C.0+DDRA3C.1*(0.41*PSL4C*ER34C*XTSL+0.58*PSM4C*ER34C*(IF TIME GT 86 THEN 0.75 ELSE 0.65))/SUM(I = -3 TO 0 : FPRA1C(I))+DDRA3C.2*POPN3)

NOB = 64 NOVAR = 3
RANGE = 1967 3 TO 1983 2
RSQ = 0.97417 CRSQ = 0.97333 F(2/61) = 1150.380
SER = 0.0431 SSR = 0.113 DW(0) = 1.84 COND(X) = 57.45
LHS MEAN = 0.12319 SR = 0.

COEF	VALUE	ST ER	T-STAT	MEAN
DDRA3C.0	-5.36616	0.27840	-19.27510	0.25000
DDRA3C.1	0.23443	0.05880	3.98680	0.36082

DDRA3C.2	0.24481	0.00990	24.73510	5.63764

8: PRA3C = BPRA3C+JS3*(PRA3C.0+PRA3C.4*EXRA3C+PRA3C.6*PSM4C*ER34C+PRA3C.2*PSL4C*ER34C)

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.99199 CRSQ = 0.99159 F(3/60) = 2478.360
SER = 10.2490 SSR = 6302.550 DW(0) = 1.99 COND(X) = 11.87
LHS MEAN = 58.33570 SR = 0.00085

COEF	VALUE	ST ER	T-STAT	MEAN
PRA3C.0	-14.95440	7.77262	-1.92398	0.25000
PRA3C.4	-28.37510	9.79150	-2.89793	0.25040
PRA3C.6	0.53119	0.06705	7.92254	44.70900
PRA3C.2	0.39034	0.02015	19.36870	116.38700

9: PRA3 = BPRA3+(PRA3.1*JS4+PRA3.2*JS1+PRA3.3*JS2+PRA3.4*JS3)*(SUM(I = -4 TO -1 : PRA3C(I))*(1+(PSL4-SUM(I = -4 TO -1 : PSL4C(I)))/SUM(I = -4 TO -1 : PSL4C(I))))+(PRA3.5*JS4+PRA3.6*JS1+PRA3.7*JS2+PRA3.8*JS3)*SUM(I = -4 TO -1 : PRA3C(I))*(1+(PSM4-SUM(I = -4 TO -1 : PSM4C(I)))/SUM(I = -4 TO -1 : PSM4C(I)))+PRA3.9*QRA3C+PRA3.10*ER34

NOB = 64 NOVAR = 10
RANGE = 1967 3 TO 1983 2
RSQ = 0.98474 CRSQ = 0.98219 F(9/54) = 387.132
SER = 12.8440 SSR = 8908.300 DW(0) = 1.64 COND(X) = 41.80
LHS MEAN = 230.98100 SR = -9.62524

COEF	VALUE	ST ER	T-STAT	MEAN
PRA3.1	0.70607	0.08358	8.44737	56.71760
PRA3.2	0.14160	0.21735	0.65147	55.59710
PRA3.3	1.05744	0.13638	7.75377	57.68330
PRA3.4	0.94595	0.08994	10.51820	58.27460
PRA3.5	0.24808	0.08311	2.98496	57.05530
PRA3.6	0.83311	0.20843	3.99707	57.49360
PRA3.7	-0.07157	0.13468	-0.53139	58.98960
PRA3.8	0.03573	0.10173	0.35118	55.97670
PRA3.9	-5.49829	4.60822	-1.19315	0.42815
PRA3.10	8.88617	4.24571	2.09297	1.08190

10: FPRA1C = BFPRA1C+JS3*(FPRA1C.0+FPRA1C.1*(PRA3C-CROW)+FPRA1C.3*QRA3C+FPRA1C.4*TIME+FPRA1C.5*C1RA3C(-4))

NOB = 64 NOVAR = 5

```
RANGE =  1967 3 TO 1983 2
RSQ =   0.99774      CRSQ =   0.99758      F(4/59) =  6499.200
SER =   4.8410       SSR =  1382.650       DW(0) =  1.96      COND(X) =    30.62
LHS MEAN =     50.95070      SR =      0.00427

COEF            VALUE            ST ER          T-STAT          MEAN

FPRA1C.0     -13.03260         6.37611        -2.04397        0.25000
FPRA1C.1       0.93169         0.03125        29.81080       57.06320
FPRA1C.3      -3.31010         2.01491        -1.64280        0.42815
FPRA1C.4       0.33535         0.20866         1.60717       17.25000
FPRA1C.5     -30.42480         5.86587        -5.18674        0.10924
```

```
11:  FPRA1 = BFPRA1+(FPRA1.1*JS3+FPRA1.2*JS4+FPRA1.3*JS1+FPRA1.4*JS2)*(SUM(I = -3 TO 0 : FPRA1C(I))*(1+(PRA3-SUM(I = -3
 TO 0 : PRA3C(I)))/SUM(I = -3 TO 0 : PRA3C(I))))
```

```
NOB = 64      NOVAR = 4
RANGE =  1967 3 TO 1983 2
RSQ =   0.98547      CRSQ =   0.98474      F(3/60) =  1356.170
SER =   10.7495      SSR =  6933.130       DW(0) =  1.32      COND(X) =     1.00
LHS MEAN =     203.80300      SR =      63.2407

COEF            VALUE            ST ER          T-STAT          MEAN

FPRA1.1        0.99283         0.01222        81.22660       50.12030
FPRA1.2        1.00687         0.01229        81.95360       49.66000
FPRA1.3        0.99960         0.01225        81.60630       50.76720
FPRA1.4        1.01284         0.01202        84.26050       51.64280
```

APPENDIX I

MODEL: FLAXSEED

SYMBOL DECLARATIONS

ENDOGENOUS:

FIFL1C	- FLAXSEED CLOSING CROP YEAR FARM INVENTORIES, WESTERN CANADA (MIL T)
FMFL1	- FLAXSEED QUARTERLY FARM MARKETINGS, WESTERN CANADA (MIL T)
FMFL1C	- FLAXSEED CROP YEAR FARM MARKETINGS, WESTERN CANADA (MIL T)
FPFL1	- FLAXSEED QUARTERLY FARM PRICE, WESTERN CANADA ($/T)
FPFL1C	- FLAXSEED CROP YEAR FARM PRICE, WESTERN CANADA ($/T)
PFL3	- FLAXSEED QUARTERLY PRICE, THUNDER BAY ($/T)
PFL3C	- FLAXSEED CROP YEAR PRICE, THUNDER BAY ($/T)
QFL1C	- FLAXSEED PRODUCTION, WESTERN CANADA (MIL T)

EXOGENOUS:

AFL1C	- FLAXSEED ACREAGE, WESTERN CANADA (00,000 ACRES)
CROW	- TRANSPORTATION COST, SCOTT SASKATCHEWAN TO PORT ($/T)
DSCFL1C	- FLAXSEED CROP YEAR SEED, FEED, WASTE AND DOCKAGE DISAPPEARANCE, WESTERN CANADA (MIL T)
ER34	- QUARTERLY EXCHANGE RATE (CDN $/US $)
ER34C	- CROP YEAR EXCHANGE RATE (CDN $/US $)
FIRA3C	- CANOLA CLOSING CROP YEAR FARM INVENTORIES, CANADA (MIL T)
FPRA1C	- CANOLA CROP YEAR FARM PRICE, WESTERN CANADA ($/T)
JS1	- SEASONAL DUMMY VARIABLE FOR FIRST QUARTER
JS2	- SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
JS3	- SEASONAL DUMMY VARIABLE FOR THIRD QUARTER
JS4	- SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
PRA3C	- CANOLA CROP YEAR PRICE, VANCOUVER ($/T)
PSL4	- SOYBEAN OIL QUARTERLY PRICE, DECATUR (US $/T)
PSL4C	- SOYBEAN OIL CROP YEAR PRICE, DECATUR (US $/T)
PSM4	- SOYBEAN MEAL QUARTERLY PRICE, DECATUR (US $/T)
PSM4C	- SOYBEAN MEAL CROP YEAR PRICE, DECATUR (US $/T)
TIME	- TIME TREND
YFL1C	- FLAXSEED YIELD, WESTERN CANADA (KG/ACRE)

POLICY:

BFIFL1C BFMFL1 BFMFL1C BFPFL1 BFPFL1C BPFL3 BPFL3C BQFL1C

COEFFICIENT:

FMFL1.0 FMFL1.1 FMFL1.10 FMFL1.11 FMFL1.12 FMFL1.2 FMFL1.3 FMFL1.4 FMFL1.5 FMFL1.6 FMFL1.7 FMFL1.8
FMFL1.9 FMFL1C.0 FMFL1C.1 FMFL1C.2 FPFL1.1 FPFL1.2 FPFL1.3 FPFL1.4 FPFL1C.0 FPFL1C.1 FPFL1C.2 FPFL1C.3
FPFL1C.4 PFL3.1 PFL3.2 PFL3.3 PFL3.4 PFL3.5 PFL3.6 PFL3.7 PFL3.8 PFL3C.0 PFL3C.1 PFL3C.2 PFL3C.4 PFL3C.

EQUATIONS

FLAXSEED PRODUCTION, WEST:

1: QFL1C = BQFL1C+AFL1C*YFL1C/10000

FLAXSEED FARM MARKETINGS, WEST (1967Q3-1983Q2):

```
2:      FMFL1C = BFMFL1C+JS3*(FMFL1C.0+FMFL1C.1*(QFL1C+FIFL1C(-4))+FMFL1C.2*(PFL3C/SUM(I = -3 TO 0 : FPFL1C(I))))

  FLAXSEED FARM MARKETINGS, WEST (1967Q3-1983Q2):
3:      FMFL1 = BFMFL1+JS3*(-0.01056+0.10908*FIFL1C(-4)+0.53877*(FMFL1C(-4)-FMFL1(-1)-FMFL1(-2)-FMFL1(-3))+FMFL1.0
        +FMFL1.1*(QFL1C+FIFL1C(-4))+FMFL1.2*(FPFL1-FPFL1(-1))+FMFL1.3*(-0.01056+0.10908*FIFL1C(-4)+0.53877*(FMFL1C
        (-4)-FMFL1(-1)-FMFL1(-2)-FMFL1(-3))))+JS4*(FMFL1.4+FMFL1.5*FMFL1C(-1)+FMFL1.6*(FPFL1-FPFL1(-1)))+JS1*(
        FMFL1.7+FMFL1.8*(FMFL1C(-2)-FMFL1(-1))+FMFL1.9*(FPFL1-FPFL1(-1)))+JS2*(FMFL1.10+FMFL1.11*(FMFL1C(-3)-FMFL1
        (-1)-FMFL1(-2))+FMFL1.12*(FPFL1-FPFL1(-1)))

  FLAXSEED CLOSING FARM STOCKS, WEST:
4:      FIFL1C = BFIFL1C+JS3*(QFL1C+FIFL1C(-4)-FMFL1C-DSCFL1C)

  FLAXSEED PRICE, THUNDER BAY (1967Q3-1983Q2):
5:      PFL3C = BPFL3C+JS3*(PFL3C.0+PFL3C.1*(QFL1C+FIFL1C(-4))+PFL3C.5*FIRA3C(-4)+PFL3C.2*PSL4C*ER34C+PFL3C.4*
        PRA3C)

  FLAXSEED PRICE, THUNDER BAY (1967Q3-1983Q2):
6:      PFL3 = BPFL3+(PFL3.1*JS4+PFL3.2*JS1+PFL3.3*JS2+PFL3.4*JS3)*SUM(I = -4 TO -1 : PFL3C(I))*(1+(PSL4-SUM(I =
        -4 TO -1 : PSL4C(I)))/SUM(I = -4 TO -1 : PSL4C(I)))+(PFL3.5*JS4+PFL3.6*JS1+PFL3.7*JS2+PFL3.8*JS3)*(SUM(I
         = -4 TO -1 : PFL3C(I))*(1+(PSM4-SUM(I = -4 TO -1 : PSM4C(I)))/SUM(I = -4 TO -1 : PSM4C(I))))+PFL3.6*ER34

  FLAXSEED FARM PRICE, WEST (1967Q3-1983Q2):
7:      FPFL1C = BFPFL1C+JS3*(FPFL1C.0+FPFL1C.1*(PFL3C-CROW)+FPFL1C.2*FPRA1C+FPFL1C.3*QFL1C+FPFL1C.4*TIME)

  FLAXSEED FARM PRICE, WEST (1967Q3-1983Q2):
8:      FPFL1 = BFPFL1+(FPFL1.1*JS3+FPFL1.2*JS4+FPFL1.3*JS1+FPFL1.4*JS2)*(SUM(I = -3 TO 0 : FPFL1C(I))*(1+(PFL3-
        SUM(I = -3 TO 0 : PFL3C(I)))/SUM(I = -3 TO 0 : PFL3C(I))))
```

```
2:  FMFL1C = BFMFL1C+JS3*(FMFL1C.0+FMFL1C.1*(QFL1C+FIFL1C(-4))+FMFL1C.2*(PFL3C/SUM(I = -3 TO 0 : FPFL1C(I))))

NOB = 64      NOVAR = 3
RANGE =  1967 3 TO 1983 2
RSQ =   0.9969       CRSQ =   0.9968       F(2/61) =  9813.260
SER =   0.0121       SSR =  8.886E-03      DW(0) =  1.99      COND(X) =    28.90
LHS MEAN =       0.11343      SR =       0.

COEF            VALUE           ST ER          T-STAT          MEAN

FMFL1C.0      -0.02660         0.03601        -0.73885         0.25000
FMFL1C.1       0.65139         0.01298        50.18570         0.15751
FMFL1C.2       0.06120         0.03206         1.90906         0.28562
```

```
3:  FMFL1 = BFMFL1+JS3*(-0.01056+0.10908*FIFL1C(-4)+0.53877*(FMFL1C(-4)-FMFL1(-1)-FMFL1(-2)-FMFL1(-3))+FMFL1.0+FMFL1.1*(
QFL1C+FIFL1C(-4))+FMFL1.2*(FPFL1-FPFL1(-1))+FMFL1.3*(-0.01056+0.10908*FIFL1C(-4)+0.53877*(FMFL1C(-4)-FMFL1(-1)-FMFL1(-2)
-FMFL1(-3))))+JS4*(FMFL1.4+FMFL1.5*FMFL1C(-1)+FMFL1.6*(FPFL1-FPFL1(-1)))+JS1*(FMFL1.7+FMFL1.8*(FMFL1C(-2)-FMFL1(-1))+
FMFL1.9*(FPFL1-FPFL1(-1)))+JS2*(FMFL1.10+FMFL1.11*(FMFL1C(-3)-FMFL1(-1)-FMFL1(-2))+FMFL1.12*(FPFL1-FPFL1(-1)))
```

```
NOB = 64      NOVAR = 13
RANGE =  1967 3 TO 1983 2
RSQ =   0.76201      CRSQ =   0.70601      F(12/51) =    13.608
SER =   0.0307       SSR =  4.814E-02      DW(0) =  1.83      COND(X) =     7.59
LHS MEAN =      0.11190      SR =      0.00001

COEF            VALUE            ST ER          T-STAT          MEAN

FMFL1.0       0.03787        0.02767        1.36854        0.25000
FMFL1.1       0.03915        0.03408        1.14880        0.15751
FMFL1.2     2.71674E-04    2.11876E-04      1.28223        1.73594
FMFL1.3       -0.22112        0.26949       -0.82050        0.01437
FMFL1.4       0.01435        0.02420        0.59283        0.25000
FMFL1.5       0.31246        0.05073        6.15876        0.11343
FMFL1.6     8.07154E-04    3.87998E-04      2.08030       -0.16875
FMFL1.7       0.03184        0.02133        1.49269        0.25000
FMFL1.8       0.18174        0.06685        2.71867        0.07453
FMFL1.9     4.02649E-04    1.82760E-04      2.20315        0.26022
FMFL1.10      -0.01885        0.01790       -1.05320        0.25000
FMFL1.11      0.54237        0.07618        7.11932        0.05292
FMFL1.12    5.36190E-04    3.82632E-04      1.40132        0.19470
```

5: PFL3C = BPFL3C+JS3*(PFL3C.0+PFL3C.1*(QFL1C+FIFL1C(-4))+PFL3C.5*FIRA3C(-4)+PFL3C.2*PSL4C*ER34C+PFL3C.4*PRA3C)

```
NOB = 64      NOVAR = 5
RANGE =  1967 3 TO 1983 2
RSQ =   0.97948      CRSQ =   0.97809      F(4/59) =    704.184
SER =   17.8810      SSR =  18864.200      DW(0) =  2.00      COND(X) =    33.26
LHS MEAN =      62.46170      SR =      0.00211

COEF            VALUE            ST ER          T-STAT          MEAN

PFL3C.0       50.91160       18.35660        2.77348        0.25000
PFL3C.1      -77.57420       19.28030       -4.02350        0.15751
PFL3C.5       99.94670       42.32570        2.36137        0.03272
PFL3C.2       0.39559        0.10045        3.93815       116.38700
PFL3C.4       0.21668        0.20771        1.04315        58.33570
```

6: PFL3 = BPFL3+(PFL3.1*JS4+PFL3.2*JS1+PFL3.3*JS2+PFL3.4*JS3)*SUM(I = -4 TO -1 : PFL3C(I))*(1+(PSL4-SUM(I = -4 TO -1 : PSL4C(I)))/SUM(I = -4 TO -1 : PSL4C(I)))+(PFL3.5*JS4+PFL3.6*JS1+PFL3.7*JS2+PFL3.8*JS3)*(SUM(I = -4 TO -1 : PFL3C(I))*(1+(PSM4-SUM(I = -4 TO -1 : PSM4C(I)))/SUM(I = -4 TO -1 : PSM4C(I))))+PFL3.6*ER34

```
NOB = 64      NOVAR = 8
RANGE =  1967 3 TO 1983 2
RSQ =   0.97545      CRSQ =   0.97238      F(7/56) =    317.908
SER =   17.9733      SSR =  18090.300      DW(0) =  2.06      COND(X) =    30.94
```

LHS MEAN = 247.89000 SR = 90.6738

COEF	VALUE	ST ER	T-STAT	MEAN
PFL3.1	0.44594	0.08884	5.01981	60.77290
PFL3.2	-0.02670	0.26765	-0.09975	59.70310
PFL3.3	0.82906	0.15116	5.48474	61.25380
PFL3.4	0.61836	0.10148	6.09351	63.38290
PFL3.5	0.54986	0.08705	6.31629	61.51460
PFL3.6	1.02052	0.25819	3.95259	62.60630
PFL3.7	0.17554	0.14875	1.18013	62.61170
PFL3.8	0.36743	0.10815	3.39736	60.64420

7: FPFL1C = BFPFL1C+JS3*(FPFL1C.0+FPFL1C.1*(PFL3C-CROW)+FPFL1C.2*FPRA1C+FPFL1C.3*QFL1C+FPFL1C.4*TIME)

NOB = 64 NOVAR = 5
RANGE = 1967 3 TO 1983 2
RSQ = 0.99688 CRSQ = 0.99667 F(4/59) = 4716.320
SER = 6.2032 SSR = 2270.300 DW(0) = 2.00 COND(X) = 26.41
LHS MEAN = 55.24590 SR = 0.00417

COEF	VALUE	ST ER	T-STAT	MEAN
FPFL1C.0	28.03470	7.62654	3.67594	0.25000
FPFL1C.1	0.68450	0.03675	18.62740	61.18920
FPFL1C.2	0.41008	0.06115	6.70610	50.95070
FPFL1C.3	-16.44600	7.65889	-2.14731	0.13935
FPFL1C.4	-0.71006	0.19196	-3.69897	17.25000

8: FPFL1 = BFPFL1+(FPFL1.1*JS3+FPFL1.2*JS4+FPFL1.3*JS1+FPFL1.4*JS2)*(SUM(I = -3 TO 0 : FPFL1C(I))*(1+(PFL3-SUM(I = -3 TO 0 : PFL3C(I)))/SUM(I = -3 TO 0 : PFL3C(I))))

NOB = 64 NOVAR = 4
RANGE = 1967 3 TO 1983 2
RSQ = 0.98461 CRSQ = 0.98384 F(3/60) = 1279.130
SER = 12.4611 SSR = 9316.790 DW(0) = 1.00 COND(X) = 1.00
LHS MEAN = 220.98400 SR = 70.1887

COEF	VALUE	ST ER	T-STAT	MEAN
FPFL1.1	0.98408	0.01267	77.64590	55.56860
FPFL1.2	0.99444	0.01275	78.01820	55.03870
FPFL1.3	1.01293	0.01310	77.32320	54.49190
FPFL1.4	1.00652	0.01314	76.61660	54.91660

APPENDIX J

```
MODEL: SOYBEANS


SYMBOL DECLARATIONS


ENDOGENOUS:
   PSM2     - SOYBEAN MEAL QUARTERLY WHOLESALE PRICE, TORONTO ($/T)
   PSM2C    - SOYBEAN MEAL CROP YEAR WHOLESALE PRICE, TORONTO ($/T)
   PS021    - SOYBEAN QUARTERLY ELEVATOR PRICE, CHATHAM ($/T)
   PS021C   - SOYBEAN CROP YEAR ELEVATOR PRICE, CHATHAM ($/T)
   QS03C    - SOYBEAN PRODUCTION, CANADA (MIL T)

EXOGENOUS:
   AS03C    - SOYBEAN ACREAGE, CANADA (00,000 ACRES)
   DEMBAR1  - DUMMY VARIABLE FOR U.S. SOYBEAN EXPORT EMBARGO
   ER34     - QUARTERLY EXCHANGE RATE (CDN $/US $)
   ER34C    - CROP YEAR EXCHANGE RATE (CDN $/US $)
   JS1      - SEASONAL DUMMY VARIABLE FOR FIRST QUARTER
   JS2      - SEASONAL DUMMY VARIABLE FOR SECOND QUARTER
   JS3      - SEASONAL DUMMY VARIABLE FOR THIRD QUARTER
   JS4      - SEASONAL DUMMY VARIABLE FOR FOURTH QUARTER
   PSM4     - SOYBEAN MEAL QUARTERLY PRICE, DECATUR (US $/T)
   PSM4C    - SOYBEAN MEAL CROP YEAR PRICE, DECATUR (US $/T)
   PS04     - SOYBEAN QUARTERLY PRICE, CHICAGO (US $/T)
   PS04C    - SOYBEAN CROP YEAR PRICE, CHICAGO (US $/T)
   YS03C    - SOYBEAN YIELD, CANADA (KG/ACRE)

POLICY:
   BPSM2  BPSM2C  BPS02  BPS02C  BQS03C

COEFFICIENT:
   PSM2.1  PSM2.2  PSM2.3  PSM2.4  PSM2.5  PSM2C.0  PSM2C.1  PSM2C.2  PS02C.0  PS02C.1  PS02C.2  PS021.1  PS021.2
   PS021.3  PS021.4


EQUATIONS


      SOYBEAN PRODUCTION, CANADA:
   1:       QS03C = BQS03C+AS03C*YS03C/10000

      SOYBEAN ELEVATOR PRICE, CHATHAM (1967Q3-1983Q2):
   2:       PS021C = BPS02C+JS3*(PS02C.0+PS02C.1*PS04C*ER34C+PS02C.2*QS03C)

      SOYBEAN ELEVATOR PRICE, CHATHAM (1967Q3-1983Q2):
   3:       PS021 = BPS02+(PS021.1*JS4+PS021.2*JS1+PS021.3*JS2+PS021.4*JS3)*(SUM(I = -4 TO -1 : PS021C(I))*(1+(PS04-
            SUM(I = -4 TO -1 : PS04C(I)))/SUM(I = -4 TO -1 : PS04C(I))))

      SOYBEAN MEAL PRICE, TORONTO (1968Q3-1983Q2):
   4:       PSM2C = BPSM2C+JS3*(PSM2C.0+PSM2C.1*PSM4C*ER34C+PSM2C.2*DEMBAR1)
```

SOYBEAN MEAL PRICE, TORONTO (1969Q3-1983Q2):

```
5:      PSM2 = BPSM2+(PSM2.1*JS4+PSM2.2*JS1+PSM2.3*JS2+PSM2.4*JS3)*(SUM(I = -4 TO -1 : PSM2C(I))*(1+(PSM4-SUM(I =
        -4 TO -1 : PSM4C(I)))/SUM(I = -4 TO -1 : PSM4C(I))))+PSM2.5*ER34
```

```
2:  PS021C = BPS02C+JS3*(PS02C.0+PS02C.1*PS04C*ER34C+PS02C.2*QS03C)
```

```
NOB = 64      NOVAR = 3
RANGE =  1967 3 TO 1983 2
RSQ =   0.99932      CRSQ =   0.9993      F(2/61) =  4.49E+04
SER =   2.5651       SSR =   401.366      DW(0) =  1.99      COND(X) =     9.99
LHS MEAN =     51.13960      SR =      0.0038

COEF            VALUE          ST ER          T-STAT          MEAN

PS02C.0       -2.70851        1.90846       -1.41921        0.25000
PS02C.1        1.02785        0.01327       77.43660       53.55530
PS02C.2      -30.29360        5.31564       -5.69895        0.10662
```

```
3:  PS021 = BPS02+(PS021.1*JS4+PS021.2*JS1+PS021.3*JS2+PS021.4*JS3)*(SUM(I = -4 TO -1 : PS021C(I))*(1+(PS04-SUM(I = -4
 TO -1 : PS04C(I)))/SUM(I = -4 TO -1 : PS04C(I))))
```

```
NOB = 64      NOVAR = 4
RANGE =  1967 3 TO 1983 2
RSQ =   0.99122      CRSQ =   0.99078      F(3/60) =  2256.980
SER =   7.7648       SSR =  3617.570       DW(0) =  0.60      COND(X) =     1.00
LHS MEAN =    202.99400      SR =     -0.40707

COEF            VALUE          ST ER          T-STAT          MEAN

PS021.1        0.99997        0.00932       107.34200       48.24710
PS021.2        0.99520        0.00911       109.25700       49.80800
PS021.3        1.01184        0.00849       119.12700       53.17140
PS021.4        1.02666        0.00905       113.40400       50.05020
```

```
4:  PSM2C = BPSM2C+JS3*(PSM2C.0+PSM2C.1*PSM4C*ER34C+PSM2C.2*DEMBAR1)
```

```
NOB = 60      NOVAR = 3
RANGE =  1968 3 TO 1983 2
RSQ =   0.99415      CRSQ =   0.99395      F(2/57) =  4845.340
SER =   7.5129       SSR =  3217.310       DW(0) =  2.00      COND(X) =     5.89
LHS MEAN =     51.42540      SR =      0.0014
```

COEF	VALUE	ST ER	T-STAT	MEAN
PSM2C.0	13.08590	5.76867	2.26844	0.25000
PSM2C.1	1.02437	0.02900	35.32260	46.16490
PSM2C.2	51.82620	7.81670	6.63019	0.01667

5: PSM2 = BPSM2+(PSM2.1*JS4+PSM2.2*JS1+PSM2.3*JS2+PSM2.4*JS3)*(SUM(I = -4 TO -1 : PSM2C(I))*(1+(PSM4-SUM(I = -4 TO -1 : PSM4C(I)))/SUM(I = -4 TO -1 : PSM4C(I))))+PSM2.5*ER34

NOB = 56 NOVAR = 5
RANGE = 1969 3 TO 1983 2
RSQ = 0.90439 CRSQ = 0.8969 F(4/51) = 120.609
SER = 24.9558 SSR = 31762.500 DW(0) = 1.21 COND(X) = 6.76
LHS MEAN = 212.90600 SR = -4.79286

COEF	VALUE	ST ER	T-STAT	MEAN
PSM2.1	0.95977	0.05854	16.39440	51.29720
PSM2.2	0.97113	0.05850	16.60070	52.49570
PSM2.3	1.00151	0.05574	17.96720	54.53690
PSM2.4	1.02634	0.05990	17.13530	51.02290
PSM2.5	5.34891	10.60600	0.50433	1.08262

APPENDIX K. INTRA-SAMPLE SIMULATION RESULTS OF THE ACREAGE AND INDIVIDUAL COMMODITY SUBMODELS (1970 3 TO 1983 2)

Endogenous variable	Mean	RMS error	RMS % error	Turning points missed
Acreage Submodel				
ABA1C	111.07	6.50	5.7	1 (8%)
ABA2C	5.26	0.38	7.2	3 (25%)
ACO3C	18.83	0.66	4.1	3 (25%)
AFL1C	15.87	3.59	23.3	4 (33%)
AOA1C	41.89	3.14	7.8	5 (42%)
AOA2C	11.60	0.57	4.9	1 (8%)
ARA3C	44.14	6.98	16.4	3 (25%)
ARY1C	7.46	1.50	20.1	3 (25%)
ASF1C	269.86	15.92	6.1	7 (58%)
ASO3C	5.37	0.46	9.0	4 (33%)
AWB1C	207.33	8.73	4.0	2 (17%)
AWD1C	30.96	4.40	15.4	3 (25%)
AWH1C	238.29	8.15	3.1	1 (8%)
AWH2C	5.34	0.68	11.4	3 (25%)
QFEAG3C	5,174.20	1,785.82	3.4	0 (0%)
Wheat Submodel				
CIWH3C	6.99	1.00	14.0	8 (67%)
DDWH3C	1.87	0.04	2.3	5 (42%)
DFWH1C	1.25	0.09	7.8	5 (42%)
DFWH2C	0.82	0.15	21.2	9 (75%)
EXPWH1	161.49	8.46	5.1	9 (18%)
EXPWH1C	162.40	5.57	3.2	0 (0%)
EXPWH3	157.58	10.71	8.4	14 (27%)
FIWH1	13.96	0.78	9.1	0 (0%)
FIWH1C	4.55	0.95	34.5	1 (8%)
FMWB1	3.65	0.60	18.9	4 (8%)
FMWH1	4.14	0.60	16.4	3 (6%)
FMWH1C	16.39	1.36	8.8	2 (17%)
IWH3C	11.65	0.28	2.9	1 (8%)
OPWH1	99.99	6.31	6.6	12 (24%)
OPWH1C	99.99	5.12	4.7	1 (8%)
QWB1C	15.42	0.00	0.00	0 (0%)
QWH1C	17.58	0.00	0.00	0 (0%)
QWh2C	0.65	0.00	0.00	0 (0%)
XAPWH1C	20.20	9.36	43.8	4 (33%)

- continued -

APPENDIX K. INTRA-SAMPLE SIMULATION RESULTS OF THE ACREAGE AND INDIVIDUAL COMMODITY SUBMODELS (1970 3 TO 1983 2) (Continued)

Endogenous variable	Mean	RMS error	RMS % error	Turning points missed
XIPWH1	117.40	7.64	7.4	20 (39%)
XIPWH1C	105.76	9.72	10.8	7 (58%)
XPWH1C	135 07	7.91	8.4	2 (17%)
XPWH3	139.18	8.20	4.8	9 (18%)
XPWH3C	140.06	5.92	3.5	1 (8%)
Durum Submodel				
FIWD1C	0.62	0.30	78.3	2 (17%)
FMWD1	0.49	0.13	110.5	8 (16%)
FMWD1C	1.96	0.30	15.3	3 (25%)
QWD1C	2.17	0.00	0.0	0 (0%)
XAPWD1C	26.30	7.81	25.3	3 (25%)
XIPWD1	123.73	13.66	10.7	15 (29%)
XIPWD1C	107.88	5.52	3.1	3 (25%)
XPWD1C	153.05	12.49	8.7	1 (8%)
Barley Submodel				
CIBA3C	2.06	0.28	16.2	4 (33%)
DFBA1C	4.24	0.20	4.8	4 (33%)
DFBA2C	1.70	0.19	10.9	6 (50%)
EXPBA3	114.85	11.63	9.5	16 (31%)
EXPBA3C	116.75	4.94	4.8	0 (0%)
FIBA1	6.84	0.37	9.5	0 (0%)
FIBA1C	1.70	0.30	27.9	2 (17%)
FMBA1	1.45	0.32	25.4	10 (20%)
FMBA1C	5.68	0.35	6.3	3 (25%)
IBA3C	3.89	0.28	12.1	1 (8%)
OPBA1	80.29	8.03	13.0	13 (25%)
OPBA1C	80.29	5.77	9.6	2 (17%)
OPBA3	96.35	8.87	11.1	10 (20%)
OPBA3C	96.65	5.67	7.2	1 (8%)
QBA1C	10.35	0.00	0.0	0 (0%)
QBA2C	0.58	0.00	0.0	0 (0%)
XAPBA1C	8.03	7.95	101.4	4 (33%)
XIPBA1	81.10	6.80	9.4	19 (37%)
XIPBA1C	76.77	8.76	11.9	3 (25%)
XPBA1C	90.19	7.66	8.0	0 (0%)

- continued -

APPENDIX K. INTRA-SAMPLE SIMULATION RESULTS OF THE ACREAGE AND INDIVIDUAL COMMODITY SUBMODELS (1970 3 TO 1983 2) (Continued)

Endogenous variable	Mean	RMS error	RMS % error	Turning points missed
DFOA1C	2.70	0.23	9.2	4 (33%)
F1OA1	2.42	0.75	22.5	0 (0%)
F1OA1C	0.78	0.36	49.7	3 (25%)
FMOA1	0.15	0.04	37.0	21 (41%)
FMOA1C	0.58	0.12	24.4	6 (50%)
OPA1C	73.28	6.89	9.6	12 (24%)
OPOA1C	73.28	1.73	2.4	0 (0%)
OPOA3	92.58	7.65	9.0	11 (22%)
OPOA3C	92.58	2.64	3.3	0 (0%)
QOA1C	3.37	0.00	0.0	0 (0%)
QOA2C	0.83	0.00	0.0	0 (0%)
Rue Submodel				
FPRY1	92.80	19.50	19.8	15 (29%)
QRY1C	0.49	0.00	0.0	0 (0%)
Corn Submodel				
DDCO3C	0.86	0.06	7.2	4 (33%)
DSCCO3C	3.67	0.12	4.4	1 (8%)
EXCO3C	0.32	0.12	415.5	4 (33%)
FPCO2	97.85	5.29	6.0	6 (12%)
FPCO2C	99.17	3.34	3.8	1 (8%)
ICO3C	0.75	0.32	149.60	5 (42%)
IMCO3C	0.78	0.16	29.8	1 (8%)
QCO3C	4.15	0.00	0.0	0 (0%)
Canola Submodel				
CIRA3C	0.54	0.14	43.4	1 (8%)
DDRA3C	0.57	0.08	22.0	5 (42%)
FIRA3C	0.16	0.11	484.7	1 (8%)
FMRA3	0.43	0.10	28.4	16 (31%)
FMRA3C	1.73	0.08	5.4	0 (0%)
FPRA1	230.37	24.1	10.5	9 (18%)
FPRA1C	230.37	27.1	15.9	3 (25%)
IRA3C	0.69	0.23	65.9	2 (17%)
PRA3	259.70	24.77	9.8	10 (20%)
PRA3C	262.55	21.95	9.7	2 (17%)
QRA3C	1.97	0.00	0.0	0 (0%)

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APPENDIX K. INTRA-SAMPLE SIMULATION RESULTS OF THE ACREAGE AND INDIVIDUAL COMMODITY SUBMODELS (1970 3 TO 1983 2) (Concluded)

Endogenous variable	Mean	RMS error	RMS % error	Turning points missed
Flaxseed Submodel				
FIFL1C	0.09	0.02	51.3	4 (33%)
FMFL1	0.12	0.03	49.1	14 (27%)
FMFL1C	0.47	0.03	7.3	1 (8%)
FPFL1	246.10	34.70	14.2	13 (25%)
FPFL1C	246.10	32.93	15.1	2 (17%)
PFL3	275.63	41.53	15.3	10 (20%)
PFL3C	278.38	37.47	13.7	2 (17%)
QFL3C	0.58	0.00	0.0	0 (0%)
Soybean Submodel				
PSM2	221.27	18.10	9.2	6 (12%)
PSM2C	221.27	15.69	6.9	2 (17%)
PSO21	227.16	7.62	3.2	6 (12%)
PSO21C	229.17	5.53	2.4	1 (8%)
QSO3C	0.47	0.00	0.0	0 (0%)

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